האגודה הישראלית לחקר העין והראיה
Israel Society for Vision and Eye Research

ARVO CHAPTER AFFILIATE

PROGRAM

30th Annual Meeting

AVENUE Convention & Events Center

Airport City

March 11-12, 2010

תכנית

הכינוס השנתי ה- 30

מרכז אירועים וקונגרסים "אוניו"

קרית שדה התעופה

12-11 מרץ, 2010

עריכת התוכנית:

ד"ר תמר בן-יוסף, פרופ' איתן בלומנטל וד"ר דרור שרון

עיצוב והבאה לדפוס: יעקב אלבז, הדסה עין-כרם.

לראות

העמותה לחקר בריאות העין
ומניעת עיוורון בישראל (ע"ר)

יושבי-ראש של האגודה הישראלית לחקר העין והראיה

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Prof. Michael Belkin	1983-1985	פרופ' מיכאל בלקין
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Prof. Shabtay Dikstein	1990-1993	פרופ' שבתאי דיקשטיין
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Prof. Jacob Pe'er	2000-2003	פרופ' יעקב פאר
Prof. Ahuva Dovrat	2004-2006	פרופ' אהובה דברת
Prof. Mordechai Rosner	2007-2009	פרופ' מרדכי רוזנר
Prof. Eyal Banin	2010-	פרופ' איל בנין

חברי ועד האגודה הישראלית לחקר העין והראיה

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Prof. Arieh Solomon			**פרופ' אריה סולומון**

מרצים זוכים המקבלים פרס על עבודות שהוצגו בכינוס השנתי ה-29, מרץ 2009

RECIPIENTS OF AWARDS FOR THE BEST POSTERS AND TALKS PRESENTED AT THE 29TH MEETING, MARCH 2009

1. יהושע קרוגר- מרכז רפואי הדסה, ירושלים

JOSHUA KRUGER- HADASSAH-HEBREW UNIVERSITY MEDICAL CENTER

עבור ההרצאה: FOR THE ORAL PRESENTATION:

"The Amino Acid Derivative DL-Trifluoroleucine acts as a chemorepellent to pseudomonas aeruginosa"

הפרס על עבודה זו הינו השתתפות בכינוס ARVO בארצות-הברית במימון

Pfizer Pharmaceutical Israel Ltd.

2. אוריאל שפירר- מרכז רפואי סוראסקי, תל-אביב

ORIEL SPIERER- TEL AVIV SOURASKY MEDICAL CENTER

עבור ההרצאה: FOR THE ORAL PRESENTATION:

"The efficacy of color Doppler ultrasound for diagnosis and follow-up of orbital hemangioma in children"

3. ניירוז פרח- הטכניון, חיפה

FARAH NAIROUZ- THE TECHNION- HAIFA

עבור הפוסטר: FOR THE POSTER:

"Holographic dynamic control of neuronal populations in the retina"

4. אירית בכר- מרכז רפואי רבין, פתח-תקוה

IRIT BAHAR- RABIN MEDICAL CENTER, PETAH-TIQVA

עבור הפוסטר: FOR THE POSTER:

"The effect of topical steroids on blood glucose profile in diabetic patients"

פרסים 2-4 הינם בחסות

"לראות"- העמותה למחקר בריאות העין ומניעת עיוורון בישראל

תודה לחברות שתרמו לכינוס:

Thanks to the sponsoring companies

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לראות
העמותה לחקר בריאות העין ומניעת עיוורון בישראל

מטרות "לראות"

* מציאת מזור למחלות עיניים הגורמות לעיוורון באמצעות הגברת המאמץ המחקרי בישראל.
* העלאת מודעות המוסדות הממשלתיים לחשיבות המכרעת בקידום מחקרים בתחום בריאות העין, כולל מחקרים במחלות "יתומות".
* העלאת המודעות הציבורית לחשיבות הטיפול המונע.

המועצה המדעית של "לראות"

מרכזת פרויקטים מחקריים הקיימים בישראל בתחום רפואת העיניים, בוחנת ומתקצבת אותם במסגרת המשאבים העומדים לרשותה על פי סדר עדיפויות מוגדר. המועצה פועלת לגיוס מיטב החוקרים מתחומים רלוונטיים וכן להקמת רשת מחקרית בינלאומית.
בין חברי המועצה המדעית גורמים בכירים מתחומי הבריאות, האקדמיה והתעשייה.
זהו שילוב ייחודי של מומחים הכולל: רופאים ומדענים בתחומי המחקר ורפואת העיניים, ראשי מחלקות למחקר ופיתוח בחברות פרמצבטיות מובילות, בכירים בסקטור העסקי בעלי ראיה כלכלית ומדעית.

כיצד "לראות" פועלת?

העמותה מממשת את מטרותיה באמצעות תרומות מגופים ממשלתיים, מחברות עסקיות ותאגידים, מתורמים פרטיים ומקרנות בישראל ובחו"ל.

בין יוזמות עמותת "לראות"

חודש מודעות לרפואה מונעת בעיניים
"אל תהיה עיוור לסכנה-בדיקה פשוטה אחת יכולה להציל את הראייה שלך"
תכנית פעילה למימון מחקרים, סמינר הרצאות בשידור חי, אתר מידע פעיל כולל פורומים של רופאים בכירים ובחירת משרד הבריאות בעמותה כגוף מייעץ בתחום תרופות וטכנולוגיות חדשות.

מחקרים ממומנים ע"י עמותת לראות 2007-2009

הצעות מחקר מצטיינות זכו למימון בגובה 2,900,000 ₪, כתוצאה מפעילותה האינטנסיבית של העמותה

א. **פרופ'' רות אשרי-פדן**, הפקולטה לרפואה ע"ש סאקלר, אוניברסיטת ת"א:
"חקר המנגנונים המולקולאריים המעורבים בבקרת התפתחות תאי הפיגמנט בעין יונקים".

ב. **פרופ' אייל בנין**, המחלקה למחלות עיניים, בית החולים האוניברסיטאי הדסה הפקולטה לרפואה האוניברסיטה העברית ירושלים:
"תאי גזע עובריים אנושיים כמקור לתאי אפיתל פיגמנטי ברשתית".

ג. **דר' תמר בן יוסף**, המחלקה לגנטיקה, הפקולטה לרפואה ע"ש רפפורט, הטכניון:
"מפוי גנים וזהוי מוטציות בגנים האחראיים לרטיניטיס פיגמנטוזה במשפחות ערביות ויהודיות מצפון הארץ".

ד. **דר' דרור שרון**, המרכז למחלות ניוונויות של המקולה והרשתית, בית החולים האוניברסיטאי הדסה, ירושלים:
"אפיון גנטי של מחלות ניוון מקולרי תורשתיות באוכלוסיה הישראלית".

ה. **פרופ' אידו פרלמן**, הפקולטה למדעי הרפואה, המחלקה לפיסיולוגיה, הטכניון חיפה.
"התפשטות תהליכים ניוונים מפוטורצפטורים חולים מסוג קנים לפוטורצפטורים בריאים מסוג מדוכים במודל חולדה לרטיניטיס פיגמנטוזה".

ו. **פרופ' אריה סולומון**, הפקולטה לרפואה, אוניברסיטת תל אביב.
"שילוב ננו טכנולוגיות וחומרים ביו-טכנולוגיים חדשים ליצירת טיפול אינטגרטיבי לרפוי עצב הראייה לאחר חבלה או מחלה".

ז. **פרופ' איתי חוברס**, מחלקת עיניים, המרכז הרפואי הדסה עין כרם, ירושלים.
"אפיון מעורבות תתי אוכלוסיות של תאי דם לבנים והרצפטורים לכמוקינים CCR2 ו-CXECR בפתוגנזה של ניוון מקולרי גילי (נמ"ג).

ח. **דר' ניצה גולדנברג-כהן**, מרכז רפואי שניידר לרפואת ילדים בישראל.
"הזרקה תוך עינית של תאי גזע ממח עצם בוגר לרשתית מתפתחת בעין של עכברים בני יומם".

ט. **דר' מיכאל ויסבורד**, מחלקת עיניים, המרכז הרפואי איכילוב, ת"א.
"שימוש טופיקלי באבסטין למחלות עיניים**.**

ISRAEL SOCIETY FOR VISION AND EYE RESEARCH
XXX ANNUAL MEETING
AVENUE CONVENTION & EVENTS CENTER
PROGRAM AT A GLANCE

Thursday, March 11, 2010

Session	Location	Time	Page
Registration and Coffee	Exhibition Hall	08:00 – 08:30	9
Opening Remarks	Lecture Hall	08:30 – 08:35	9
Poster Session 1	Lecture Hall	08:35 – 09:20	9-12
Glaucoma, Oncology, and other	Lecture Hall	09:20 – 10:30	13-14
Coffee and Posters	Exhibition Halls	10:30 – 11:00	14
Poster Session 2	Lecture Hall	11:00 – 12:00	14-19
Cataract	Lecture Hall	12:00 – 13:00	19-20
Lunch break	Dining Room	13:00 – 14:00	20
Guest Lecture 1	Lecture Hall	14:00 – 14:30	21
Awars and ISVER update	Lecture Hall	14:30 – 15:00	21
Genetics 1	Lecture Hall	15:00 – 15:40	21-22
Cornea 1	Lecture Hall	15:40 – 16:30	22-23
Poster viewing, Wine & Cheese	Exhibition Halls	16:30 – 17:30	23
Retina 1	Lecture Hall	17:30 – 18:30	23-24
Dinner (optional)			24

Friday, March 12, 2010

Session	Location	Time	Page
Coffee and posters	Exhibition Hall	08:00 – 08:30	25
Pediatric Ophthal and Visual function	Lecture Hall	08:30 – 09:30	25-26
Retina 2 and AMD	Lecture Hall	09:30 – 10:30	26-27
Guest Lecture 2	Lecture Hall	10:30 – 11:00	27
Coffee and Posters	Exhibition Halls	11:00 – 11:30	27
Genetics 2	Lecture Hall	11:30 – 12:20	28-29
Cornea 2	Lecture Hall	12:20 – 13:20	29-30
Concluding Remarks	Lecture Hall	13:20 – 13:25	30

Moderators and commIttee members, please note: You should select two presentations for the Young Investigator Award for the best oral presentation and the best poster presentation. The candidates are marked by AC (AC: Award Candidate).

PROGRAM

Thursday, March 11, 2010

Registration 08:00 – 08:30

Opening Remarks 08:30 – 08:35

Prof. Eyal Banin

Session I – Poster presentations 1 08:35 – 09:20

Moderators: Prof. Mordechai Rosner and Prof. Itay Chowers

AC (1) KOSLOWE KENNETH C. (1) * GLASSMAN TANYA
(1) TZANANI-LEVI CHANA (1) SHNEOR EINAT
(1) HADASSAH ACADEMIC COLLEGE DEPARTMENT OF OPTOMETRY

10. **SCREENING FOR DIABETIC RETINOPATHY WITH A MOBILE NON-MYDRIATIC FUNDUS CAMERA IN THE SOUTHERN ISRAEL. PRELIMINARY RESULTS** **40**
(1) * LEVY JAIME (1) KNYAZER BORIS (1) LIFSHITZ TOVA
(1) DEPARTMENT OF OPHTHALMOLOGY, SOROKA UNIVERSITY MEDICAL CENTER, BEER-SHEVA, ISRAEL

11. **DIFFERENT SCREENING POLICIES FOR HEPATITIS B** **41**
(1) * FISCHER NAOMI (1) ALBA MAYA (1) VARSSANO DAVID
(1) DEPARTMENT OF OPHTHALMOLOGY, TEL AVIV SOURASKY MEDICAL CENTER, SACKLER FACULTY OF MEDICINE, TEL AVIV UNIVERSITY, TEL AVIV, ISRAEL.

12. **A NOVEL TECHNIQUE: A DOUBLE USE OF A CORNEAL GRAFT FOR DESCEMET'S STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY AND COVERAGE OF GLAUCOMA DRAINAGE DEVICE TUBES** **42**
(1) * SPIERER ORIEL (1) RACHMIEL RONY (1) LAZAR MOSHE
(1) ALBA MAYA (1) VARSSANO DAVID
(1) DEPARTMENT OF OPHTHALMOLOGY, TEL AVIV SOURASKY MEDICAL CENTER AND SACKLER FACULTY OF MEDICINE, TEL AVIV UNIVERSITY

13. **DISCRIMINATING BETWEEN FASTER PERIPHERY AND SLOWER FOVEA USING ERP** **43**
(1) * YEHEZKEL OREN (1) STERKIN ANNA (1) POLAT URI
(1) FACULTY OF MEDICINE, GOLDSCHLEGER EYE RESEARCH INSTITUTE, SHEBA MEDICAL CENTER, TEL HASHOMER, TEL AVIV UNIVERSITY, ISRAEL.

14. **CENTRAL CORNEAL THICKNESS IN NON-ARTERITIC ANTERIOR ISCHEMIC OPTIC NEUROPATHY PATIENTS IS NOT SIGNIFICANTLY DIFFERENT FROM NORMAL CONTROLS** **44**
(1) JABALY-HABIB HANEEN (1) NAFTALI MODI (2) * HILO WASSIM (2) HAMED-AZZAM SHIRIN (2) BRISCOE DANIEL
(1) DEPT. OF OPHTHALMOLOGY, PORIA HOSPITAL, PORIA
(2) DEPT. OF OPHTHALMOLOGY, HAEMEK MEDICAL CENTER, AFULA

15. **REFRACTIVE PROFILE IN ALBINISM AND IT'S CORRELATION WITH VISUAL ACUITY** **45**
(1) TZUR VERONICA (1) GLANZER SHERRY (2) BLUMENFELD ANAT (1) ANTEBY IRENE (1) ELI DALIA (2) GREIFNER GABRIEL (1) ROSENMANN ADA (1) * YAHALOM CLAUDIA
AC

Session II – Glaucoma, Oncology, other 09:20 – 10:30

Moderators: Prof. Jacob Pe'er and Prof. Eytan Blumenthal

10:00-10:10 **CARCINOEMBRYONIC ANTIGEN- RELATED CELL ADHESION MOLECULE-1 (CEACAM-1) IN POSTERIOR UVEAL MELANOMA: CORRELATION WITH CLINICAL AND HISTOLOGICAL SURVIVAL MARKERS** **55**

(1) * KHATIB NUR (2) MARKEL GAL (1) PE'ER JACOB (1) FRENKEL SHAHAR (2) SCHACHTER JACOB (1) AMER RADGONDE

(1) DEPARTMENT OF OPHTHALMOLOGY, HADASSAH-HEBREW UNIVERSITY MEDICAL CENTER, JERUSALEM (2) THE ELLA INSTITUTE FOR MELANOMA RESEARCH AND TREATMENT, SHEBA CANCER RESEARCH CENTER, SHEBA MEDICAL CENTER, ISRAEL

10:10-10:20 **OCULAR SARCOIDOSIS CAN BE EXCLUDED BY ANALYSIS OF T CELL SUBSETS IN INDUCED SPUTUM** **56**

(1) * MESHI AMIT (2) NEUDORFER MEIRA (2) FIREMAN ELIZABETH

(1) MEIR MEDICAL CENTER (2) TEL AVIV MEDICAL CENTER

10:20-10:30 **ENDOSCOPIC DIODE LASER DCR: RESULTS OF A CASE SERIES IN TWO CENTERS** **57**

(1) * BRISCOE DANIEL (2) KENNETH RON

(1) MEIR MEDICAL CENTER, KFAR SABA (2) EMEK MEDICAL CENTER, AFULA

Coffee and Posters (Exhibition Halls) 10:30 – 11:00

Session III – Poster presentations 2 11:00 – 12:00

Moderators: Prof. Ari Barzilai and Prof. Arieh Solomon

No.	**TITLE**	**Page**
21.	**INFLUENCE OF MINOCYCLINE ON LASER INDUCED RETINAL DAMAGE IN RATS** (1) * PIVEN ILIA (2) BELOKOPYTOV MARK (2) BELKIN MICHAEL (2) ROSNER MORDECHAI (1) LEVKOVITCH-VERBIN HANI (1) GOLDSCHLEGER EYE INSTITUTE, TEL-AVIV UNIVERSITY, SHEBA MEDICAL CENTER, TEL-HASHOMER (2) GOLDSCHLEGER EYE RESEARCH INSTITUTE, TEL-AVIV UNIVERSITY, SHEBA MEDICAL CENTER, TEL-HASHOMER	**58**
22.	**INTRAVITREAL INJECTION OF ADULT BONE MARROW DERIVED STEM CELLS TO DEVELOPING RETINA OF NEWBORN MICE** (1) * SADIKOV TAMILLA (1) AVRAHAM-LUBIN BAT-CHEN	**59**

AC

REVITAL (2) ASKENASY NADIR (3) GOLDENBERG-COHEN NITZA
(1) THE KRIEGER EYE RESEARCH LABORATORY, FMRC, RABIN CAMPUS, TEL AVIV UNIVERSITY (2) THE FRANKEL LABORATORY FOR STEM CELL RESEARCH, FMRC (3) THE PEDIATRIC UNIT, SCHNEIDER CHILDREN'S MEDICAL CENTER OF ISRAEL, PETACH TIQWA AND SACKLER SCHOOL OF MEDICINE, TEL AVIV UNIVERSITY

23. **THE POSSIBLE NEUROPROTECTIVE EFFECT OF ROY PEPETIDE LIGATION TO MEMBRANAL GRP78 IN THE ISCHEMIC RETINA** **60**

AC

(1) * GAYDAR VERA (1) DRATVIMAN-STOROBINSKY OLGA (2) GOLDSTEIN TAMAR (3) RAITER ANAT (3) HARDY BRITTA (4) GOLDENBERG-COHEN NITZA
(1) THE KRIEGER EYE RESEARCH LABORATORY, FELSENSTEIN MEDICAL RESEARCH CENTER, TEL AVIV UNIVERSITY (2) SACKLER SCHOOL OF MEDICINE, TEL AVIV UNIVERSITY, TEL AVIV (3) LABORATORY OF CELLULAR AND VASCULAR IMMUNOLOGY, FELSENSTEIN MEDICAL RESEARCH CENTER, TEL AVIV UNIVERSITY (4) PEDIATRIC UNIT, DEPARTMENT OF OPHTHALMOLOGY, SCHNEIDER CHILDREN'S MEDICAL CENTER, PETAH TIQWA, AND SACKLER SCHOOL OF MEDICINE, TEL AVIV UNIVERSITY

24. **GROWTH FACTORS ENHANCE THE DIFFERENTIATION OF ADULT BONE MARROW DERIVED STEM CELLS IN ISCHEMIC MURINE RETINA** **61**

AC

(1) * AVRAHAM-LUBIN BAT-CHEN REVITAL (2) ASKENASY NADIR (3) GOLDENBERG-COHEN NITZA
(1) THE KRIEGER EYE RESEARCH LABORATORY, FELSENSTEIN MEDICAL RESEARCH CENTER, TEL AVIV UNIVERSITY (2) FRANKEL LABORATORY FOR STEM CELL RESEARCH, PETACH TIKVA (3) PEDIATRIC UNIT, OPHTHALMOLOGY DEPARTMENT, SCHNEIDER CHILDREN'S MEDICAL CENTER OF ISRAEL, PETACH TIKVA, AND SACKLER FACULTY OF MEDICINE, TEL AVIV UNIVERSITY, TEL AVIV

25. **THE ROLE OF RASSF1A IN UVEAL MELANOMA** **62**

AC

(1) * DRATVIMAN-STOROBINSKY OLGA (2) COHEN YORAM (1) BINKOVSKY NATALIA (3) FRENKEL SHAHAR (3) PE'ER JACOB (4) GOLDENBERG-COHEN NITZA
(1) THE KRIEGER EYE RESEARCH LABORATORY, FELSENSTEIN MEDICAL RESEARCH CENTER, TEL AVIV UNIVERSITY (2) DEPARTMENT OF GYNECOLOGY, SHEBA CANCER RESEARCH CENTER, SHEBA MEDICAL CENTER, TEL HASHOMER (3) DEPARTMENT OF OPHTHALMOLOGY, HADASSAH-HEBREW UNIVERSITY MEDICAL CENTER, JERUSALEM, ISRAEL (4) PEDIATRIC UNIT, DEPARTMENT OF

OPHTHALMOLOGY, SCHNEIDER CHILDREN'S MEDICAL CENTER, PETAH TIQWA AND SACKLER SCHOOL OF MEDICINE, TEL AVIV UNIVERSITY, TEL AVIV

26. **THE HAPTOGLOBIN GENOTYPE DOES NOT AFFECT EARLY ONSET OF TYPE 2 DIABETIC RETINOPATHY** **63**
(1) * REICH EHUD (2) GABBAY MEIRAV (3) DRATVIMAN-STOROBINSKY OLGA (1) WEINBERGER DOV (4) GOLDENBERG-COHEN NITZA (2) GABBAY URI
(1) OPHTHALMOLOGY DEPARTMENT, RABIN MEDICAL CENTER, TEL AVIV UNIVERSITY SACKLER FACULTY OF MEDICINE (2) CLALIT COMMUNITY OPHTHALMOLOGY CLINIC, DAN DISTRICT (3) KRIEGER LABORATORY OF EYE RESEARCH, FELSENSTEIN MEDICAL RESEARCH CENTER PETAH TIKVA (4) KRIEGER LABORATORY OF EYE RESEARCH, FELSENSTEIN MEDICAL RESEARCH CENTER PETAH TIKVA, ISRAEL. TEL AVIV UNIVERSITY SACKLER FACULTY OF MEDICINE. OPHTHALMOLOGY DEPARTMENT, RABIN MEDICAL CENTER, PEDIATRIC UNIT, SCHNEIDER CHILDREN'S MEDICAL CENTER OF ISRAEL, PETAH TIKVA.

27. **MOLECULAR CHARACTERIZATION OF CERKL: A GENE UNDERLYING AUTOSOMAL RECESSIVE SEVERE RETINAL DEGENERATION WITH EARLY MACULAR INVOLVEMENT** **64**
AC
(1) * VEKSLIN SHARON (1) BEN-YOSEF TAMAR
(1) DEPARTMENT OF GENETICS AND THE RAPPAPORT FAMILY INSTITUTE FOR RESEARCH IN THE MEDICAL SCIENCES, FACULTY OF MEDICINE, TECHNION, HAIFA

28. **CORTACTIN AND ITS TYROSINE-PHOSPHORYLATED ISOFORMS IN OCULAR TISSUE** **65**
(1) * KOTEV-EMETH SHLOMO (1) KREDY-FARHAN LILY (1) ROSNER MORDECHAI (1) SAVION NAPHTALI
(1) GOLDSCHLEGER EYE RESEARCH INSTITUTE, SACKLER FACULTY OF MEDICINE, TEL AVIV UNIVERSITY, SHEBA MEDICAL CENTER, TEL HASHOMER

29. **A MUTATION OF THE PDE6G GENE CAUSES AUTOSOMAL RECESSIVE RETINITIS PIGMENTOSA** **66**
AC
(1) * DVIR LIRON (2) SHALEV STAVIT A. (1) BEN-YOSEF TAMAR
(1) GENETICS DEPARTMENT – FACULTY OF MEDICINE, TECHNION, HAIFA, ISRAEL (2) GENETICS INSTITUTE , HA′EMEK MEDICAL CENTER, AFULA, ISRAEL

30. **THE USE OF BIOLOGICAL ADHESIVE IN LAMELLAR CORNEAL GRAFT** **67**
(1) * NAFTALI MODI (2) BIANCO -PELED HAVAZELET
(1) PADE MEDICAL CENTER IN PORIA (2) HATECHNION HAIFA, CHEMICAL ENGINEERING

31. **A HOMOZYGOUS NONSENSE MUTATION IN THE TRPM1 GENE CAUSES AUTOSOMAL RECESSIVE CONGENITAL STATIONARY NIGHT BLINDNESS IN THE MUSLIM POPULATION** **68**

(1) ZELINGER LINA (1) BANIN EYAL (1) * SHARON DROR
(1) DEPARTMENT OF OPHTHALMOLOGY, HADASSAH-HEBREW UNIVERSITY MEDICAL CENTER, JERUSALEM

32. **BEYOND PRESSURE MAINTENANCE, NUTRITION SUPPLY AND WAIST PRODUCTS REMOVING, NEW ROLES FOR THE AQUEOUS HUMOR IN THE DRAINAGE SYSTEM** **69**

AC

(1) * LATARIA GALI (2) YULISH MICHAEL
(1) CLINICAL PHARMACOLOGY, BEN-GURION UNIVERSITY OF THE NEGEV (2) OPHTHALMOLOGY DEPARTMENT, REBBECA ZIV HOSPITAL, ZEFAT

33. **NOVEL RDH5 MUTATIONS AMONG ISRAELI FUNDUS ALBIPUNCTATUS PATIENTS.** **70**

(1) * PRAS ERAN (2) SHARON DROR (2) BANIN EYAL (3) ABU ALMOGIT (1) RAVECH SVETLANA (4) ROTENSTREICH YGAL
(1) DEPARTMENT OF OPHTHALMOLOGY, ASSAF HAROFEH MEDICAL CENTER, ZERIFIN (2) DEPARTMENT OF OPHTHALMOLOGY, HADASSAH-HEBREW UNIVERSITY MEDICAL CENTER, JERUSALEM (3) GARTNER INSTITUTE OF HUMAN GENETICS, SHEBA MEDICAL CENTER, TEL HASHOMER (4) DEPARTMENT OF OPHTHALMOLOGY, SHEBA MEDICAL CENTER, TEL HASHOMER.

34. **RETINAL TOXICITY OF INTRAVITREAL ENOXAPARIN IN RABBIT AND RAT MODELS** **71**

AC

(1) * MANASHEROV ANNA (2) ZEMEL ESTHER (1) RUMELT SHIMON (1) SEGAL ZVI (1) REHANY URI (2) PERLMAN IDO
(1) WESTERN GALILEE - NAHARIYA MEDICAL CENTER, NAHARIYA, ISRAEL (2) RUTH AND BRUCE RAPPAPORT FACULTY OF MEDICINE, TECHNION, HAIFA, ISRAEL

35. **THE EFFECT OF MINOCYCLINE ON MICROGLIAL ACTIVATION IN EXPERIMENTAL GLAUCOMA MODEL IN RATS** **72**

(1) * WASSERZUG YAEL (2) ROSNER MORDECHAI
(1) VANDER SHELLY (1) LEVKOVITCH-VERBIN HANI
(1) THE SAM ROTHBERG OPHTHALMIC MOLECULAR BIOLOGY LABORATORY, SHEBA TEL HASHOMER (2) THE GOLDSCHLEGER EYE RESEARCH INSTITUTE, SACKLER FACULTY OF MEDICINE, SHEBA MEDICAL CENTER, TEL HASHOMER

36. **CRITICAL ROLE OF THE NBS1 PROTEIN IN THE DEVELOPMENT AND FUNCTION OF THE MOUSE VISUAL SYSTEM** **73**

(1) SOLOMON ARIEH S. (2) BARANES KOBY (1) * NITZAN ANAT (2) GALRON RONIT (2) FISHELSON URI
(1) ROTENSTREICH YGAL (2) ASSAF YANIV (3) SHILOH YOSEF (4) WANG ZHAO-QI (2) BARZILAI ARI
(1) GOLDSCHLEGER EYE RESEARCH INSTITUTE, SHEBA MEDICAL CENTER, TEL HASHOMER (2) DEPARTMENT OF NEUROBIOLOGY, GEORGE S. WISE FACULTY OF LIFE SCIENCES (3) DEPARTMENT OF HUMAN MOLECULAR GENETICS AND BIOCHEMISTRY, SACKLER SCHOOL OF MEDICINE, (4) LEBNITZ INSTITUTE FOR AGE RESEARCH-FRITZ LIPMAN INSTITUTE E.V. 07745 JENA, GERMANY

37. **IMMUNE BASED TREATMENTS ENHANCED OPTIC NERVE AXONAL REGENERATION AND GROWTH FOLLOWING CONTROLLED INJURY** **74**
(1) * GOLDFEATHER SHALHEVET (2) NITZAN ANAT
(1) BARZILAI ARI (2) SOLOMON ARIEH
(1) DEPARTMENT OF NEUROBIOLOGY, GEORGE S. WISE FACULTY OF LIFE SCIENCES, TEL AVIV UNIVERSITY, TEL AVIV (2) THE GOLDSCHLEGER EYE RESEARCH INSTITUTE, SACKLER FACULTY OF MEDICINE, TEL-AVIV UNIVERSITY, SHEBA MEDICAL CENTER, TEL HASHOMER

38. **THE EFFECT OF THE APOE GENOTYPE ON RETINAL NEOVASCULARIZATION IN AN APOLIPOPROTEIN E TRANSGENIC MICE MODEL OF OXYGEN-INDUCED RETINOPATHY** **75**
(1) MAHARSHAK IDIT (2) LIVNAT TAMI (2) NISGAV YAEL
(3) ROSNER MORDECHAI (3) * SOLOMON ARIEH
(4) WEINBERGER DOV (1) MICHAELSON DANIEL
(1) DEPT OF NEUROBIOLOGY, TEL AVIV UNIVERSITY
(2) FELSENSTEIN MEDICAL RESEARCH CENTER (FMRC), RABIN MEDICAL CENTER (3) GOLDSCHLEGER EYE RESEARCH INSTITUTE, FACULTY OF MEDICINE , SHEBA MEDICAL CENTER, TEL HASHOMER (4) DEPT OF OPHTHALMOLOGY AND FELSENSTEIN MEDICAL RESEARCH CENTER (FMRC), THE RABIN MEDICAL CENTER

39. **ELUCIDATING THE TRANSCRIPTIONAL TARGETS OF PAX6 IN MAMMALIAN RETINOGENESIS** **76**
AC
(1) * OREN-GILADI PAZIT (1) ASHERY-PADAN RUTH
(1) DEPARTMENT OF HUMAN MOLECULAR GENETICS AND BIOCHEMISTRY, TEL AVIV UNIVERSITY

40. **DUAL REQUIREMENT FOR PAX6 IN RETINAL PROGENITOR CELLS** **77**
AC
(1) * CHEN FARHY (1) ORON-KARNI VARDA (1) ELGART MICHAEL (1) YARON ORLY (1) RAMIZOVA LENA
(1) ASHERY-PADAN RUTH
(1) SACKLER FACULTY OF MEDICINE, HUMAN MOLECULAR

GENETICS AND BIOCHEMISTRY, TEL AVIV UNIVERSITY

41. **ZINC-DESFERRIOXAMINE COMPLEX ATTENUATES RETINAL DEGENERATION IN RD10 MICE BY REDUCING IRON-INDUCED OXIDATIVE INJURY** **78**
(1) * OBOLENSKY ALEXEY (2) BULVIK BARUCH
(2) BERENSHTEIN EDUARD (1) LEDERMAN MICHAL
(1) CHOWERS ITAY (2) CHEVION MORDECHAI (1) BANIN EYAL
(1) OPHTHALMOLOGY, HEBREW UNIVERSITY-HADASSAH MEDICAL SCHOOL, JERUSALEM (2) CELLULAR BIOCHEMISTRY AND HUMAN GENETICS, HEBREW UNIVERSITY-HADASSAH MEDICAL SCHOOL, JERUSALEM

42. **VEGF - IS IT A NEW MARKER FOR METASTATIC UVEAL MELANOMA?** **79**
(1) * BARAK VIVIAN (2) FRENKEL SHAHAR (1) KALICKMAN INA (2) PE'ER JACOB
(1) IMMUNOLOGY LABORATORY FOR TUMOR DIAGNOSIS AND (2) DEPARTMENT OF OPHTHALMOLOGY, HADASSAH - HEBREW UNIVERSITY MEDICAL CENTER, JERUSALEM

43. **USING ZEBRAFISH TO UNDERSTAND NORMAL AND ABNORMAL EYE DEVELOPMENT** **80**
INBAL ADI
DEPARTMENT OF MEDICAL NEUROBIOLOGY, HEBREW UNIVERSITY MEDICAL SCHOOL, JERUSALEM, ISRAEL

Session IV - Cataract 12:00 - 13:00

Moderators: Dr. Guy Kleinmann and Prof. Ehud Assia

Time	TITLE	Page
12:00-12:10 AC	**SAFETY AND STABILITY OF AN INJECTABLE MODEL OF INTRAOCULAR TELESCOPE IN COMPARISON TO THE CURRENT INTRAOCULAR TELESCOPE MODEL** (1) * ROSEN ELI (2) SACHS DAN (3) BEN ELIAHU SHMULIK (1) ASSIA EHUD (4) KLEINMANN GUY (1) DEPARTMENT OF OPHTHALMOLOGY, MEIR MEDICAL CENTER, KFAR –SABA (2) GOLDSCHLEGER EYE RESEARCH INSTITUTE, SHEBA MEDICAL CENTER, TEL-HASHOMER (3) HARLAN BIOTECH ISRAEL, REHOVOT (4) DEPARTMENT OF OPHTHALMOLOGY, KAPLAN MEDICAL CENTER, REHOVOT	**81**
12:10-12:20	**PROTECTION OF THE EYE LENS AGAINST INJURY INDUCED BY SIMULATED DIABETIC STATE: USE OF DESFERRIOXAMINE COMPLEXES AND N-ACETYL-L-**	**82**

CYSTEINE.
(1) * DOVRAT AHUVA (1) BORMUSOV ELVIRA (3) CHEVION MORDECHAI
(1) RAPPAPORT FACULTY OF MEDICINE, TECHNION, HAIFA (2) HADASSAH MEDICAL SCHOOL, THE HEBREW UNIVERSITY, JERUSALEM

12:20-12:30 **PROSTHETIC IRIS IMPLANTATION FOR TRAUMATIC IRIS DEFICIENCY** **83**
(1) * BAHAR IRIT (2) SHEHADEH- MASHOUR RANEEN (3) KAISERMAN IGOR (2) BERG AMY LAUREN (2) SLOMOVIC ALLAN (2) ROOTMAN DAVID
(1) RABIN MEDICAL CENTER, PETACH TIQVA, ISRAEL (2) TORONTO WESTERN HOSPITAL, TORONTO, CANADA (3) BARZILAI MEDICAL CENTER, ASHKELON, ISRAEL

12:30-12:40 **CATARACT EXTRACTION IN EYES WITH UVEITIS: VISUAL OUTCOME AND COMPLICATIONS** **84**
AC
(1) * BLUMENFELD OREN (2) ZACSH DAN (2) BAREQET IRINA (2) WENDER ARIEL (2) VISHNEVSKIA - DAI VICKTORIA
(1) DEPARTMENT OF OPHTHALMOLOGY, EDITH WOLFSON MEDICAL CENTER, HOLON, TEL AVIV UNIVERSITY (2) THE GOLDSHLAGER EYE INSTITUTE, SHEBA MEDICAL CENTER, TEL HASHOMER, TEL AVIV UNIVERSITY.

12:40-12:50 **CORNEAL WOUND TEMPERATURE ELEVATION DURING MICROINCISION CATARACT SURGERY: SLEEVELESS VS COAXIAL TECHNIQUES** **85**
AC
(1) * ABULAFIA ADI (2) MICHAELI ADI (1) ASSIA EHUD I
(1) MEIR MEDICAL CENTER (2) SOURASKY MEDICAL CENTER

12:50-13:00 **OCT-GUIDED FEMTOSECOND LASER SYSTEM FOR CATARACT SURGERY** **86**
(1) * PALANKER DANIEL (1) BLUMENKRANZ MARK S. (2) ANDERSEN DAN E. (2) SCHUELE GEORG (1) FRIEDMAN NEIL (2) MARCELLINO GEORGE (3) BATLLE JUAN (4) CULBERTSON WILLIAM
(1) DEPARTMENT OF OPHTHALMOLOGY, STANFORD UNIVERSITY, STANFORD, CA (2) OPTIMEDICA CORPORATION, SANTA CLARA, CA (3) LASER CENTRO, SANTO DOMINGO, DOMINICAN REPUBLIC (4) BASCOM PALMER EYE INSTITUTE, MIAMI, FL

Lunch break 13:00 – 14:00

Guest Lecture 1 - Prof. Martin Friedlander 14:00 – 14:30

Department of Cell Biology, The Scripps Research Institute, Staff Ophthalmologist and Chief of Retina, Division of Ophthalmology, Scripps Clinic; La Jolla, California, USA

TITLE: Combination Angiostatic/Neurotrophic Therapies for the Treatment of Retinal Diseases

Young Investigator Awards and ISVER update 14:30 – 15:00

Session V – Genetics 1 15:00 – 15:40

Moderators: Dr. Eran Pras and Prof. Ruth Ashery Padan

(1) * ZELINGER LINA (1) BANIN EYAL (1) SHARON DROR
(1) DEPT. OF OPHTHALMOLOGY, HADASSAH-HEBREW UNIVERSITY MEDICAL CENTER, JERUSALEM

15:30-15:40 **ROLE FOR PAX6 IN THE MELANOGENESIS OF THE RETINAL PIGMENTED EPITHELIUM IN MICE** **90**

AC

(1) * RAVIV SHAUL (2) BHARTI KAPIL (1) ANTES RAN (1) YOFFE CHEN (1) DAVIS NOA (2) ARNHEITER HEINZ (1) ASHERY PADAN RUTH
(1) DEPARTMENT OF HUMAN MOLECULAR GENETICS AND BIOCHEMISTRY, SACKLER FACULTY OF MEDICINE, TEL AVIV UNIVERSITY, TEL AVIV, ISRAEL. (2) SECTION OF MAMMALIAN DEVELOPMENT, NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE, NATIONAL INSTITUTE OF HEALTH, BETHESDA, MD, USA.

Session VI - Cornea 1 15:40 – 16:30

Moderators: Dr. Irit Bahar and Dr. Irina Barequet

Time	TITLE	Page
15:40-15:50	**MEASURING CORNEAL CROSS-LINKING BY TERAHERTZ RADIATION** (1) * MANDEL YOSSI (2) ZADOK DAVID (3) BITMAN ASSAF (4) PELEG GADI (1) CENTER FOR BIOENGINEERING IN THE SERVICE OF HUMANITY AND SOCIETY, HEBREW UNIVERSITY OF JERUSALEM (2) DEPARTMENT OF OPHTHALMOLOGY , ASSAF HAROFEH MEDICAL CENTER, ZERIFIN, SACKLER MEDICAL SCHOOL, TEL AVIV UNIVERSITY (3) ELECTRO-OPTIC DIVISION, SOREQ NRC (4) ELECTRO-OPTIC DIVISION, SOREQ NRC	**91**
15:50-16:00	**EVALUATION OF INTRA-OCULAR PRESSURE ACCORDING TO CORNEAL THICKNESS BEFORE AND AFTER EXCIMER LASER CORNEAL ABLATION FOR MYOPIA** AC (1) * HAMED AZZAM SHIRIN (1) BRISCOE DANIEL (2) TOMKINS OREN (2) SHEHADEH-MASH'OUR RANEEN (2) GARZOZI HANNA (1) DEPARTMENT OF OPHTHALMOLOGY, HAEMEK MEDICAL CENTER, AFULA (2) HAEMEK MEDICAL CENTER, AFULA, ISRAEL (2) DEPARTMENT OF OPHTHALMOLOGY, BNAI-ZION MEDICAL CENTER, HAIFA	**92**
16:00-16:10	**A NOVEL SLIT BEAM-BASED SCORING SYSTEM FOR EVALUATING CONJUNCTIVAL HYPEREMIA**	**93**

(1) * KRUGER JOSHUA (1) FRENKEL SHAHAR (1) SOLOMON ABRAHAM
(1) DEPARTMENT OF OPHTHALMOLOGY, HADASSAH-HEBREW UNIVERSITY MEDICAL CENTER, JERUSALEM

16:10-16:20 **TOPICAL BEVACIZUMAB FOR CORNEAL NEOVASCULARIZATION AND NEOVASCULAR GLAUCOMA** **94**

AC

(1) * WAISBOURD MICHAEL (1) SOUDRY SHIRI
(1) VARSSANO DAVID (1) LEVINGER ELIYA (1) SHEMESH GABI (1) LOEWENSTEIN ANAT
(1) DEPARTMENT OF OPHTHALMOLOGY, TEL AVIV SOURASKY MEDICAL CENTER, TEL AVIV

16:20-16:30 **ACCURACY OF SCHEIMPFLUG HOLLADAY EQUIVALENT KERATOMETRY READINGS AFTER CORNEAL REFRACTIVE SURGERY** **95**
(1) BAHAR IRIT (1) BIALER OMER (1) WEINBERGER DOV
(2) * KAISERMAN IGOR
(1) RABIN MEDICAL CENTER, PETACH TIQVA
(2) BARZILAI MEDICAL CENTER, ASHKELON

Poster viewing (Exhibition Halls) 16:30 – 17:30
Wine & Cheese

Session VII - RETINA 1 17:30 - 18:30

Moderators: Prof. Benjamin Miller and Prof. Anat Loewenstein

Time	TITLE	Page
17:30-17:40	**TESTING THE SPREAD OF DEGENERATION FROM AFFECTED PHOTORECEPTORS TO NON-AFFECTED ONES**	**96**

AC

(1) * BILGORAY LIAT (1) HEINRICH RONIT (1) ZEMEL ESTHER (2) MILLER BENJAMIN (1) PERLMAN IDO
(1) RUTH & BRUCE RAPPAPORT FACULTY OF MEDICINE AND RAPPAPORT INSTITUTE, TECHNION-ISRAEL INSTITUTE OF TECHNOLOGY, HAIFA, (2) OPHTHALMOLOGY, RAMBAM MEDICAL CENTER, HAIFA

17:50-17:50 **CONTACT BETWEEN RETINAL PIGMENT EPITHELIAL (RPE) AND MICROVASCULAR ENDOTHELIAL CELLS (EC) ENHANCES ANGIOGENEIC POTENTIAL – A SIMULATION OF NON ISCHEMIC CHOROIDAL NEOVASCULAR DISEASES** **97**
(1) DARDIK RIMA (2) LIVNAT TAMI (2) NISGAV YAEL

(2) * WEINBERGER DOV
(1) INSTITUTE OF THROMBOSIS AND HEMOSTASIS, SHEBA MEDICAL CENTER, TEL-HASHOMER (2) DEPARTMENT OF OPHTHALMOLOGY, RABIN MEDICAL CENTER, AND THE SACKLER SCHOOL OF MEDICINE

17:50-18:00 **CD24 EFFECTS ON ANGIOGENESIS IN A MOUSE MODEL OF OXYGEN-INDUCED RETINOPATHY** **98**
(1) * NEWMAN HADAS (2) SHAPIRA SHIRAN (2) ARBER NADIR (2) KRAUSE SARAH (3) ROSNER MORDECHAI (3) PRI-CHEN SARAH (1) SPIERER ORIEL (1) LOEWENSTEIN ANAT (1) BARAK ADIEL
(1) OPHTHALMOLOGY DEPARTMENT, TEL AVIV SOURASKY MEDICAL CENTER (2) INTEGRATED CANCER PREVENTION CENTER, TEL AVIV SOURASKY MEDICAL CENTER (3) OPHTHALMOLOGY DEPARTMENT, GOLDSHLAGER EYE RESEARCH INSTITUTE, SHEBA MEDICAL CENTER, TEL HASHOMER

18:00-18:10 **TAM SIGNALING IN RETINAL HOMEOSTASIS** **99**
(1) * BURSTYN-COHEN TAL (2) LEMKE GREG, E.
(1) DEPT. OF OPHTHALMOLOGY, HADASSAH MEDICAL CENTER, JERUSALEM 91120 (2) MOLECULAR NEUROBIOLOGY LABORATORY, THE SALK INSTITUTE FOR BIOLOGICAL STUDIES, LA JOLLA, CA, 92037

18:10-18:20 **IN VIVO AND IN VITRO STUDIES ESTABLISHING HAPTOGLOBIN AS A MAJOR SUSCEPTIBILITY GENE FOR DIABETIC RETINOPATHY** **100**
AC
(1) * ASLEH RABEA (2) BENJAMIN MILLER (1,2) P.LEVY ANDREW
(1) TECHNION FACULTY OF MEDICINE. TECHNION-ISRAEL INSTITUTE OF TECHNOLOGY (2) DEPARTMENT OF OPHTHALMOLOGY. RAMBAM MEDICAL CENTER. HAIFA.

18:20-18:30 **DIRECTED DIFFERENTIATION OF HUMAN EMBRYONIC STEM CELLS INTO FUNCTIONAL RETINAL PIGMENT EPITHELIUM CELLS** **101**
(1) * BANIN EYAL (2) IDELSON MARIA (1) ALPER RUSLANA (1) OBOLENSKY ALEXEY (2) BEN-SHUSHAN ETTI (1) HEMO ITZHAK (2) REUBINOFF BENJAMIN
(1) CENTER FOR RETINAL AND MACULAR DEGENERATIONS OF THE DEPARTMENT OF OPHTHALMOLOGY (2) THE HADASSAH HUMAN EMBRYONIC STEM CELL RESEARCH CENTER, THE GOLDYNE SAVAD INSTITUTE OF GENE THERAPY & DEPARTMENT OF GYNECOLOGY; HADASSAH-HEBREW UNIVERSITY MEDICAL CENTER, JERUSALEM

Dinner (optional)

Friday, March 12, 2010

Coffee and Posters (Exhibition Hall) 08:00 – 08:30

Session VIII - Pediatric Ophthalmology and Visual function 08:30 - 09:30

Moderators: Dr. Uri Polat and Dr. Moshe Snir

Time	TITLE	Page
08:30-08:40	**SUB-TENON'S ROPIVACAINE BLOCK FOR PAIN RELIEF AFTER STRABISMUS SURGERY** (1) * SNIR MOSHE (2) KACHKO LUDMYLA (2) KATZ JACOB (1) FRILING RONIT (1) GOLDENBERG-COHEN NITZA (2) COHEN ELIAHU (3) EHRENBERG MIRIAM (3) AXER-SIEGEL RUTH (1) PEDIATRIC OPHTHALMOLOGY AND STRABISMUS UNIT, SCHNEIDER CHILDREN′S MEDICAL CENTER OF ISRAEL (2) DEPARTMENT OF ANESTHESIA (SCMCI) (3) DEPARTMENT OF OPHTHALMOLOGY, RABIN MEDICAL CENTER	**102**
08:40-08:50	**INTRAVITREAL BEVACIZUMAB AS A TREATMENT FOR SEVERE ROP** (1) * AXER SIEGEL RUTH (2) RON YONINA (1) WEINBERGER DOV (2) FRILING RONIT (3) SIROTA LEA (2) SNIR MOSHE (1) DEPARTMENT OF OPHTHALMOLOGY, RABIN MEDICAL CENTER, BEILINSON CAMPUS, PETAH TIKVA (2) PEDIATRIC OPHTHALMOLOGY UNIT, SCHNEIDER CHILDREN'S MEDICAL CENTER OF ISRAEL, PETAH TIKVA (3) NEONATAL INTENSIVE CARE UNIT, SCHNEIDER CHILDREN'S MEDICAL CENTER OF ISRAEL, PETAH TIKVA	**103**
08:50-09:00 AC	**RESULTS OF BILATERAL MEDIAL RECTUS MUSCLE RECESSION IN CHILDREN WITH DEVELOPMENTAL DELAY** (1) * HABOT-WILNER ZOHAR (2) SPIERER ABRAHAM (2) WYGNANSKI-JAFFE TAMARA (1) DEPARTMENT OF OPHTHALMOLOGY, TEL-AVIV SOURASKY MEDICAL CENTER, SACKLER FACULTY OF MEDICINE, TEL AVIV UNIVERSITY, TEL AVIV, ISRAEL (2) GOLDSCHLEGER EYE INSTITUTE, SHEBA MEDICAL CENTER, SACKLER FACULTY OF MEDICINE, TEL-AVIV UNIVERSITY, TEL-HASHOMER, ISRAEL	**104**
09:00-09:10	**RETREATMENT OF RESIDUAL REFRACTIVE ERRORS AFTER MYOPIC LASIK WITH FEMTOECOND LASER**	**105**

FLAPS
(1) * BAREQUET IRINA (1) HIRSH AMI (1) KREMER ISRAEL
(1) MAHLER ORI (1) DAR IDO (1) LEVINGER SAMUEL
(1) ENAIM REFRACTIVE SURGERY CENTER

09:10-09:20 **IMPROVING VISION IN PRESBYOPIA** **106**
(1) * STERKIN ANNA (1) POLAT URI
(1) TEL-AVIV UNIVERSITY, FACULTY OF MEDICINE, GOLDSCHLEGER EYE RESEARCH INSTITUTE, SHEBA MEDICAL CENTER

09:20-09:30 **DEVELOPMENT OF VISUAL CROWDING, COLLINEAR FACILITATION AND CONTOUR DETECTION** **107**
(1) * GOTTHILF-NEZRI DANA (1) POLAT URI
(1) TEL-AVIV UNIVERSITY, FACULTY OF MEDICINE, GOLDSCHLEGER EYE RESEARCH INSTITUTE, SHEBA MEDICAL CENTER

Session IX - Retina 2 and AMD 09:30 - 10:30
Moderators: Prof. Ruth Axer-Siegel and Prof. Dov Weinberger

Time	TITLE	Page
09:30-09:40	**TREATMENT OF RETINITIS PIGMENTOSA WITH 9-CIS RETINAL – A CLINICAL TRIAL** (1) * ROTENSTREICH YGAL (1) FERMAN-ATAR GILI (2) SHAISH AVIV (2) HARAZ DROR (1) BELKIN MICHAEL (1) 1. GOLDSCHLEGER EYE RESEARCH INSTITUTE, SACKLER SCHOOL OF MEDICINE, TEL AVIV UNIVERSITY, TEL HASHOMER (2) STRASSBURGER LIPID CENTER, SHEBA MEDICAL CENTER, TEL HASHOMER	**108**
09:40-09:50	**OUTCOMES OF TWENTY-GAUGE TRANSCONJUNCTIVAL SUTURELESS VITRECTOMY SURGERY** (1) * SPIERER ORIEL (1) LOEWENSTEIN ANAT (1) SIMINOVSKY ZVIA (1) BARAK ADIEL (1) DEPARTMENT OF OPHTHALMOLOGY, TEL-AVIV SOURASKY MEDICAL CENTER	**109**
09:50-10:00	**RETROBULBAR BLOOD FLOW CHANGES IN EYES WITH DIABETIC RETINOPATHY –A 10-YEAR FOLLOW-UP STUDY** (1) NEUDORFER MEIRA (1) * KESSNER RIVKA (1) GOLDENBERG DAFNA (2) KESSLER ADA (1) OPHTHALMOLOGY, TEL AVIV MEDICAL CENTER (2) RADIOLOGY, TEL AVIV MEDICAL CENTER	**110**

10:00-10:10 **SAFETY AND STABILITY OF INJECTABLE MINIATURE TELESCOPIC DEVICE IMPLANTED IN RABBIT EYES** **111**
(1) * ROSNER MORDECHAI (1) SACHS DANI (1) ZIV HANA
(1) GOLDSCHLEGER EYE RESEARCH INSTITUTE, SACKLER SCHOOL OF MEDICINE, TEL-AVIV UNIVERSITY, SHEBA MEDICAL CENTER, TEL-HASHOMER

10:10-10:20 **LEVELS OF CYTOKINES IN THE AQUEOUS HUMOR OF PATIENTS WITH AGE-RELATED MACULAR DEGENERATION.** **112**
(1) * KRAMER MICHAL (2) HASANREISOGLU MURAT (3) FELDMAN ANNA (1) AXER -SIEGEL RUTH (2) MAHRSHAK IDIT (4) MONSELISE YEHUDIT (3) GUREVICH MICHAEL (1) WEINBERGER DOV
(1) DEPARTMENT OF OPHTHALMOLOGY, RABIN MEDICAL CENTER, PETAH TIQVA AND SACKLER SCHOOL OF MEDICINE, TEL AVIV UNIVERSITY, TEL AVIV (2) DEPARTMENT OF OPHTHALMOLOGY, RABIN MEDICAL CENTER, PETAH TIQVA (3) NEUROGENOMIC LABORATORY, MULTIPLE SCLEROSIS CENTER, SHEBA MEDICAL CENTER, AND SACKLER SCHOOL OF MEDICINE, TEL AVIV UNIVERSITY, TEL AVIV (4) LABORATORY OF CLINICAL IMMUNOLOGY, RABIN MEDICAL CENTER, PETAH TIQVA

10:20-10:30 **ACU-4429: A VISUAL CYCLE MODULATOR BEING DEVELOPED FOR DRY AMD** **113**
(1) * DAVID ROBERT (2) BOMAN NANCY (3) PATIL SHIVA (3) MALLIKAARJUN SURESH (2) KUBOTA RYO
(1) DEPT OF OPHTHALMOLOGY, SURASKY MEDICAL CENTER (2) ACUCELA, INC. (3) OTSUKA, INC.

Guest Lecture 2- Prof. Martin Friedlander 10:30 – 11:00

Department of Cell Biology, The Scripps Research Institute, Staff Ophthalmologist and Chief of Retina, Division of Ophthalmology, Scripps Clinic; La Jolla, California USA

TITLE: Stemming Vision Loss with Stem Cells

Coffee and Posters (Exhibition Halls) 11:00 – 11:30

Session X – Genetics 2 11:30 - 12:20

Moderators: Dr. Tamar Ben Yosef and Dr. Dror Sharon

12:00-12:10	**THE SENSITIVITY OF THE DEVELOPING MAMMALIAN RETINA TO HIGH DOSAGES OF THE TRANSCRIPTION FACTOR PAX6** AC (1) * REMIZOVA LENA (1) ASHERY-PADAN RUTH (1) DEPARTMENT OF HUMAN MOLECULAR GENETICS AND BIOCHEMISTRY, SACKLER SCHOOL OF MEDICINE, TEL AVIV UNIVERSITY, ISRAEL	**117**
12:10-12:20	**AUTOSOMAL RECESSIVE HIGH MYOPIA AND EARLY-ONSET CATARACT IN LARGE CONSANGUINEOUS BEDOUIN KINDRED** (1) MORDECHAI SHIKMA (2) * GRADSTEIN LIBE (1) OFIR RIVKA (3) EL AMOUR KHALIL (2) LEVY JAIME (2) BELFAIR NADAV (2) LIFSHITZ TOVA (1) JOSHUA SARA (1) NARKIS GINAT (3) ELBEDOUR KHALIL (3) BIRK OHAD (1) THE MORRIS KAHN LABORATORY OF HUMAN GENETICS, NATIONAL INSTITUTE FOR BIOTECHNOLOGY IN THE NEGEV, BEN GURION UNIVERSITY, BEER-SHEVA 84105, ISRAEL (2) DEPARTMENT OF OPHTHALMOLOGY, SOROKA MEDICAL CENTER, BEER-SHEVA, ISRAEL (3) GENETICS INSTITUTE, SOROKA MEDICAL CENTER, BEER-SHEVA, ISRAEL	**118**

Session XI – Cornea 2 12:20 - 13:20

Moderators: Prof. Abraham Solomon and Prof. David Zadok

Time	TITLE	Page
12:20-12:30	**THE EPIDEMIOLOGY OF KERATOCONUS IN ISRAEL** (1) * GORDON-SHAAG ARIELA (1) SHNEOR EINAT (1) FACTOR NEHAMA (1) KUPERSHMITD SARIT (1) KOREN IFAT (1) PORAT YAFIT (2) MILLODOT MICHEL (1) DEPARTMENT OF OPTOMERTY AND VISION SCIENCE, HADASSAH ACADEMIC COLLEGE, JERUSALEM (2) SCHOOL OF OPTOMETRY AND VISION SCIENCE, CARDIFF UNIVERSITY, CARDIFF, WALES	**119**
12:30-12:40	**CHANGES IN CORNEAL CURVATURES AND ANTERIOR SEGMENT PARAMETERS AFTER DESCEMET STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY** (1) * BAHAR IRIT (2) KAISEMAN IGOR (1) LIVNY EITAN (3) SLOMOVIC ALANA (3) SLOMOVIC ALLAN (1) DEPARTMENT OF OPHTHALMOLOGY, RABIN MEDICAL CENTER, PETAH-TIQVA, ISRAEL (2) DEPARTMENT OF OPHTHALMOLOGY, BARZILAI MEDICAL CENTER, ASHKELON, ISRAEL (3) DEPARTMENT OF OPHTHALMOLOGY, TORONTO WESTERN HOSPITAL	**120**

12:40-12:50 **HUMAN LIMBAL EPITHELIAL STEM CELL MARKERS EXPRESSION IN LONG-TERM REPEATED EXPLANT CULTURES FROM CORNEOSCLERAL RIMS** **121**

(1) * WALTER EYAL (1) LANXNER NAAMA (1) MAFTZIR GENIA (1) SOLOMON AVI
(1) DEPARTMENT OF OPHTHALMOLOGY, HADASSAH-HEBREW UNIVERSITY MEDICAL CENTER

12:50-13:00 **THE RESPONSE OF CORNEAL EPITHELIAL STEM CELLS DURING THE ACUTE PHASE OF OCULAR CHEMICAL INJURY IN RABBITS** **122**

(1) * HORWITZ VERED (1) DACHIR SHLOMIT (1) SAHAR RITA (1) COHEN LIAT (1) COHEN MAAYAN (1) SHALEM YOAV (1) GUTMAN HILA (1) GEZ RELLIE (1) TVERIA LIAT (1) AMIR ADINA (1) KADAR TAMAR
(1) DEPARTMENT OF PHARMACOLOGY, ISRAEL INSTITUTE FOR BIOLOGICAL RESEARCH, NESS ZIONA

13:00-13:10 **CLINICAL AND CORNEAL BIOMECHANICAL CHANGES AFTER COLLAGEN CROSS-LINKING WITH RIBOFLAVIN AND UV IRRADIATION IN PATIENTS WITH PROGRESSIVE KERATOCONUS: LONG-TERM RESULTS** **123**

(1) * ZADOK DAVID (1) GOLDICH YAKOV (2) MARCOVICH ARIE (3) HIRSH AMI (1) AVNI ISAAC
(1) DEPARTMENT OF OPHTHALMOLOGY, ASSAF HAROFEH MEDICAL CENTER (2) DEPARTMENT OF OPHTHALMOLOGY, KAPLAN MEDICAL CENTER (3) ENAIM REFRACTIVE SURGERY CENTERS

13:10-13:20 **SURVIVAL-RATE STATISTICS FOR EXCISION OF PTERYGIUM AND CONJUNCTIVAL AUTOGRAFT** **124**

(1) * SHALEV HADAS (1) FISCHER NAOMI (1) LAZAR MOSHE (1) VARSSANO DAVID
(1) DEPARTMENT OF OPHTHALMOLOGY, TEL AVIV SOURASKY MEDICAL CENTER, SACKLER FACULTY OF MEDICINE, TEL AVIV UNIVERSITY, TEL AVIV, ISRAEL.

Concluding Remarks 13:20 – 13:25

Prof. Eyal Banin

ABSTRACTS

Session I – Poster presentations 1

COMPUTER-ASSISTED VOLUMETRIC ANALYSIS OF MACULAR INTRARETINAL CYSTS USING OPTICAL COHERENCE TOMOGRAPHY

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Purpose: Fluid accumulation in the retina and cystoid macular edema (CME) represents a common pathologic sequel of the retina and occurs in a variety of pathological conditions. Optical coherence tomography (OCT) allows qualitative assessment of macular intraretinal cysts. Automated volumetric measurement of intraretinal cysts and fluid accumulations may provide quantitative data for the diagnosis, follow up and assessment of treatment efficacy.

Methods: Implementing image analysis algorithms, we have developed a custom software (termed CYSTOMETER) that can delineate retinal tissue and intraretinal cyst borders, compute total retinal tissue area and total cyst area and from one OCT image and compute total retinal tissue volume and total cystoid volume from multiple OCT images.

Results: Analysis of OCT images of 10 patients showed the software to be reliable in delineating retinal tissue borders compared to the Cirrus OCT software. The software consistently and accurately identified macular cystoid spaces and provided quantitative information with regard to total cystoid volume versus total retinal tissue volume.

Conclusions: Analysis of retinal OCT images using CYSTOMETER software can provide reliable quantitative information that can be used in the follow-up of patients with cystoid macular edema.

PREVALENCE OF SYSTEMIC DISEASES AMONG KERATOCONUS PATIENTS

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Introduction: Keratoconus is a common condition whose causes are not fully understood. In addition to genetics, various conditions were shown to increase the risk for keratoconus. Detecting such conditions might elucidate the etiology of keratoconus. The purpose of this study was to evaluate the prevalence of chronic conditions among keratoconus patients.

Patients / Methods: We conducted a retrospective observational case control study of all the members in the Central District of Clalit Health Services in Israel. We calculated the prevalence of chronic conditions among all members who were diagnosed to have keratoconus (years 2000-2007;n=426), and 1704 age and gender matched controls randomly selected from the whole district population.

Results: The most prevalent conditions associated with keratoconus were irritable bowel syndrome (OR = 5.0, 95% CI = 2.1-12.1), rheumatoid arthritis (8.1, 1.5-44.1), Down syndrome (3.7, 1.5-9.0), chronic renal failure (3.6, 1.4-9.4), depression (2.2, 1.2-3.7), asthma (2.1, 1.4-3.2), hypothyroidism (2.0, 1.2-3.3), obesity (1.8, 1.3-2.5), and mitral valve prolapse (1.6, 1.2-5.7).

Conclusions: Various systemic conditions are significantly more common among keratoconus patients. These conditions might help us better understand the etiology of keratoconus.

EXCENTRIC RU106 PLAQUE IN TREATING POSTERIOR UVEAL MELANOMA

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Introduction: Plaque brachytherapy for choroidal melanoma is a well established treatment. However, when the choroidal melanoma is near the fovea or optic nerve, we try to attach the radioactive plaque excentrically, not leaving margins around the tumor, in order to save vision. The purpose of this study was to examine the need for optimal alignment of the Ruthenium-106 brachytherapy plaque in respect to tumor margins in treating choroidal melanomas.

Patients / Methods: Medical files and wide angled retinal photography images (Panoret, Medibell, Israel) of 292 uveal melanoma patients treated by Ru-106 brachytherapy between 1986-2007, which were documented by wide angle photography since 2003, were reviewed. We excluded patients that did not have retinal images of adequate quality (poor visibility of the full contour of the plaque's scar or the tumor). Patients with less than 6 months follow-up after brachytherapy as well as patients that were enucleated soon after brachytherapy or received multiple brachytherapy treatments were also excluded. 195 patients were included and their survival, metastasis and local recurrence rates were calculated, comparing tumors fully covered by the brachytherapy plaque with tumors reaching the plaque margin.

Results: In 130 patients (mean age 60.6±14.6, 42% males, mean follow-up: 92.2±51.2months) the whole tumor was covered by the plaque (covered group), while in 65 patients (mean age 56.0±15.5, 50.8% males, mean follow-up: 94.2±49.0months) one side of the tumor reached the plaque's scar margins - the exposed group. During the follow-up period 8 (6.2%) patients in the covered group died compared with 1 (1.5%) in the exposed group (p=0.26). Kaplan-Meier analysis did not show a statistically significant difference in mortality between the groups (p=0.13, log rank test). 3 patients in each group experienced local recurrence (2.3% in the covered group and 4.6% in the exposed group, P = 0.66). Kaplan-Meier analysis did not show a statistically significant difference in local recurrence between the groups (p=0.39, log rank test).

Conclusions: Excentric Ru-106 plaque application does not increase the risk of local recurrence, metastases or mortality and does not require re-operation. These findings can enable us to keep the Ru-106 plaque away from essential structures in the posterior pole.

EFFICACY ASSESSMENT OF VARIOUS ANTICHOLINERGIC AGENTS FOLLOWING TOPICAL-SARIN-INDUCED MIOSIS AND VISUAL IMPAIRMENT

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Introduction: Eye exposure to the organophosphorus irreversible acetylcholinesterase inhibitor sarin results in long-term miosis and reduction in visual function. Anti-cholinergic drugs, such as atropine, are used topically in order to counter these effects and obtain symptomatic relief. Unfortunately, such compounds attenuate ocular discomfort at the expense of producing mydriasis and partial cycloplegia symptoms, which may worsen visual performance. This study was aimed to test short acting drugs against sarin-induced miosis and visual impairment, which will minimally affect vision.

Patients / Methods: Male Pigmented Long-Evans rats were topically exposed to sarin (0-10 μg) or vehicle, and 20 min later were topically treated with tropicamide, cyclopetolate, atropine or saline. Pupils were illuminated with an infrared spotlight and images were digitally recorded with a computerized infrared-capable video camera, thus measuring pupil width. Miosis was determined as a 50% reduction in pupil width. Pupil width was determined 15 min -72 h following each treatment. Visual function assessment was performed using the "Cued" Morris Water Maze task, 15 min following sarin exposure. In this version, cued navigation involves finding a goal location by approaching a single cue that marks the visible goal. The cue was a circular green rod (5 cm high) attached to the visible escape platform (1 cm above the surface of the water).

Results: Rats exposed topically to various sarin doses showed a dose-dependent miosis, which returned to pre-exposure levels within 24-48 h. The threshold dose (ED50) calculated for miosis at 15-120 min following topical sarin exposure was ~0.02 μg. Significant reduction in visual function was seen in animals exposed to 0.2 and 1 μg sarin, opposed to 0.02 μg exposed or control animals. Finally, short-acting anti-cholinergic treatments differentially improved the sarin induced miosis and the resulting impairment in visual performance.

Conclusions: The miotic as well as the visual defects observed following topical sarin exposure are contradicted to various extent by different short-acting anti-cholinergic drugs.

EVALUATION OF INTRA-CORNEAL INJECTION OF 5% NATAMYCIN FOR THE TREATMENT OF FUSARIUM KERATITIS

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Introduction: To compare the clinical efficacy of intra-stromal injection of Natamycin 5% combined with topical Natamycin eye-drops to a standard therapy regimen (Natamycin 5% eye-drops) in an experimental rabbit model of Fusarium keratitis.

Patients / Methods: Fungal keratitis was induced in the right eyes of 12 New-Zealand rabbits by direct intra-stromal injection of 1.6x105 CFU/0.1ml of Fusarium spore suspension into the central cornea. Rabbits were randomly divided into two groups. Group 1,the study group, received intra- stromal injection of Natamycin 5% on treatment day 1 and 4 combined with topical Natamycin 5% eye-drops given hourly between 08:00 to 20:00 for the first 2 days followed by 4 times daily on days 3-11. Group 2, the control group, received only topical Natamycin 5% at identical interval. The eyes were examined clinically on treatment days 1,4,7 and 11. The extent of keratitis was graded by the following parameters: conjuctival hyperemia, size of corneal infiltration and epithelial defect, corneal clouding, corneal neovascularization and hypopion level. At the end of the study the rabbits were sacrificed and the corneas were examined histopathologically.

Results: Fusarium keratitis with hypopion developed in all eyes 4 days after intra-stromal inoculation. In both treatment groups, clinical improvement of keratitis was recorded. Infiltration size was statistically smaller in the intra-stromal injected group (P=0.023).No differences were found as for the conjuctival hyperemia,the corneal clouding and the hypopion level. No adverse reactions were found as for the intra-stromal drug delivery.

Conclusions: Intra-stromal injection of Natamycin 5% combined with topical Natamycin 5% is an effective treatment modality for Fusarium keratitis.

MENSTRUAL CYCLE VARIATIONS OF CORNEAL BIOMECHANICAL PARAMETERS AND THICKNESS

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Introduction: The women's cornea may be influenced by hormonal changes occurring during monthly menstrual cycles and cyclic variations of corneal topography and corneal thickness were previously described. The aim of our study was to evaluate whether cornea biomechanical properties as measured by Ocular Response Analyzer (ORA; Reichert Inc, Depew, NY) and presented by corneal hysteresis (CH) and corneal resistance factor (CRF) are vary as well during menstrual cycle.

Patients / Methods: Young healthy women were prospectively recruited. Every participant was assessed at the beginning of the menstrual cycle, then at ovulation, and at the end of the cycle. At every time point we measured CH and CRF with the ORA and central corneal thickness (CCT) with an ultrasonic pachymeter.

Results: Twelve eyes of 12 young women aged 20.2 ± 2.1(mean ± SD) years were included. CH was statistically significantly decreased at ovulation (9.6 mmHg) as compared with the beginning (10.9 mmHg, P=0.012) and the end of the cycle (11.5 mmHg, P=0.005). CRF was also significantly decreased at ovulation (9.7 mmHg) as compared with the beginning (10.5 mmHg, P=0.007) and the end of the cycle (10.9 mmHg, P=0.01). Cornea was thinnest at the beginning (547µm), thicker at ovulation (553µm) and thickest at the end of the menstrual cycle (557µm) with statistically significant difference between every two time points (all $P \leq 0.037$).

Conclusions: Corneal thickness and biomechanical parameters significantly vary during menstrual cycle. CH and CRF are temporary decreased at ovulation. Cornea is thinnest at the beginning, thicker at ovulation and thickest at the end of the cycle. These corneal changes may be important to consider during screening of candidates for laser refractive surgery.

ASSOCIATION BETWEEN KERATOCONUS AND RENAL DISEASES

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Introduction: Purpose: To compare the prevalence of renal disorders in keratoconus patients with the prevalence in an age matched non-keratoconic population. Design: Retrospective observational comparative case-control study. Participants: All the members in the Central District of Clalit Health Services in Israel who were diagnosed to have keratoconus. (years 2000-2007;n=426), and 1704 age and gender matched controls.

Patients / Methods: We calculated the prevalence of chronic renal failure, other kidney diseases and kidney transplant among the cases and controls. We also looked at the risk for osteoporosis and hypertension among the keratoconus cases. Main Outcome Measures: The odds ratio for renal disorders among keratoconus and non-keratoconus patients.

Results: On average, a significantly higher percentage of chronic renal failure were demonstrated in the keratoconus patients (1.88%), compared to matched non-keratoconic patients (0.53%, OR=3.6 95% CI=1.4-9.4) as well as a significantly higher percentage other kidney diseases (3.8% vs 1.7%, OR= 2.1, 1.1-3.9). We also noted an increased prevalence of osteoporosis (3.3% vs 1.5%, OR= 2.2 , 1.1-4.2) and hypertension (OR=1.4, 0.94-1.9) and a significant trend of increasing consumption of ACE inhibitors, alpha blockers, beta-blockers, corticosteroids, NSAID, immunosuppressants and biphosphonates in the keratoconus patients.

Conclusions: Renal disorders are significantly more common among keratoconus patients.

A NEW CONCEPT IN PHORIA TESTING: THE MONOCULAR PHORIA TEST AND ITS IMPLICATIONS

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Introduction: Vergence or in the Optometric Extension Program (OEP) vernacular, "centering", enables the individual to assess the difference between his internal visual space world and the actual physical world. The phoria, which is a classic indicators of the functioning of this vergence mechanism, is classically defined as a tendency towards a deviation between the visual axes of the two eyes. As such, esophoria and exophoria are often thought of as problems in the horizontal (X axis) meridian. The behavioral viewpoint on the other hand, felt that they indicated a positioning of the visual axes in space, on the z axis. If this positioning in space or visual behavior is an expression of basic behavior patterns in the subject then it should be visible both in the binocular and monocular performance.

Patients / Methods: Forty-seven subjects (divided to three different age groupings) were tested using the the Monocular Straw/Pointer Test. A straw mounted vertically on a flat black panel and a long wooden pointer was hand held by each subject. All subjects were wearing their normal compensatory lenses and had normal stereo-acuity. Viewing through the dominant eye, the patient was instructed to thread the pointer into the straw using their dominant hand in one smooth motion with only one attempt allowed. The distance from the target, either before or after the straw was measured in one centimeter steps.

Results: A significant statistical relationship was found ($p<0.01$) between the phoria and the positioning of the pointer. On average, esophoric subjects placed the pointer before the straw while exophoric subjects placed it beyond the straw. Groups (according to age) statistical significance was as follows: 6-12 $p=0.022$, 13-21 $p=0.033$, and 22-30 $p<0.01$. No significant correlation was shown between the amount of the phoria and the size of the positioning error. In addition we found greater positioning error for esophores.

Conclusions: A clear relationship was seen between the phoria and positioning in space or spatial awareness even in the monocular state. This lends further weight to the theory that the phoria is actually an expression of general perceptual relationships and not merely an ocular phenomenon.

ANOTHER LOOK AT ACCOMMODATIVE AMPLITUDE DETERMINATION: PULL-AWAY VERSUS PUSH-UP METHOD

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Introduction: Historically two basic methods have been utilized for measuring accommodative amplitude, the push-up method (originated by Donders) and the minus lens method. The differences between the results are well established and therefore, the two methods have different normative data. In recent years there has been a movement towards a third method, the pull-away method with a certain presumption that it is a more dependable measurement. Previous studies found no significant difference between the results of the two methods, which has lead to the use of the same normative data for both methods. The purpose of this study is to determine whether the assumption that the pull-away method measurements are not statistically different than the push –up method, is in fact true.

Patients / Methods: Amplitude of accommodation was measured on 79 subjects using both the push-up and the pull-away methods. The age range of the subjects was 7-35 years and they were divided into three separate age groups (7-12, 13-20, 21-35).

Results: A high correlation between the push-up test and the pull-away test was found in all 3 groups (Group 1: $n = 24$; $r = 0.63$; $p < .0005$. Group 2: $n = 30$; $r = 0.80$; $p < .0005$. Group 3: $n = 25$; $r = 0.91$; $p < .0005$). The t test showed a significant constant difference between both tests in all groups ($p < .0001$).

Conclusions: In this study there was a statistically significant difference between the results of the two methods. While this is not in agreement with a number of previous studies, it is in agreement with known concepts in psychophysical testing. The results would indicate that in order to effectively use the pull-away method, a standardization evaluation is needed which would provide the necessary normative data.

SCREENING FOR DIABETIC RETINOPATHY WITH A MOBILE NON-MYDRIATIC FUNDUS CAMERA IN THE SOUTHERN ISRAEL. PRELIMINARY RESULTS

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Introduction: Diabetic retinopathy is a leading cause of adult blindness and accounts for about 10% of cases of legal blindness in Israel. Retinopathy is asymptomatic until an advanced stage, and consequently screening for its presence is essential in order to identify eyes that would benefit from laser therapy. Only about half of the patients with diabetes in Israel have regular eye examination. Therefore, screening for retinopathy can reduce the incidence of blindness. Objective: To evaluate a new service for diabetic retinopathy screening that uses a mobile non-mydriatic mobile fundus camera in primary care patients. This is the first time such a service has been evaluated in the Southern Israel.

Patients / Methods: Diabetic members of the largest health maintenance organization in the Southern Israel > 18 years old were invited to non-mydriatic fundus examination between January and October 2008. Screening was performed by a trained photographer with the Topcon CRW6S non-mydriatic camera in eight different primary care centers. At least two pictures of the central fundus from each eye were obtained.

Results: A total of 4355 diabetic patients were screened. Among them, 52% of cases were classified as normal. The prevalence of diabetic retinopathy was 12.7% (1.1% of patients had proliferative retinopathy and 1.4% of patients had suspected macular edema and were referred for laser treatment). Other possible sight-threatening conditions (such as suspected glaucoma, macular hole, epiretinal membrane, choroidal neovascularization, and retinal vein occlusion) were detected in 9.3% of cases. Fundus pictures were inadequate for assessment in 16% of cases. In both cases patients were referred for complete ophthalmic examination.

Conclusions: Diabetic retinopathy screening with a mobile non-mydriatic fundus camera improved the quality of care for diabetic patients in the Southern Israel. The prevalence of diabetic retinopathy was 12.7% in the population examined. Other sight-threatening conditions were also detected. This screening method identified patients requiring prompt referral to the ophthalmologist for further complete eye examination. In conclusion, this study provided successful results of DR screening using fundus photography in primary care patients, and may suggest the need to further extend this screening program in a larger number of Israeli sites.

DIFFERENT SCREENING POLICIES FOR HEPATITIS B

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Introduction: Purpose: To evaluate discrepancy in policy regarding hepatitis B screening between the Eye Bank Association of America (EBAA) and the European Eye Bank Association (EEBA). To calculate total donors accepted using each policy at our institution.

Patients / Methods: Viral hepatitis screening results were collected retrospectively for cornea donors in the Tel Aviv Medical Center between January 1 2006 and October 18 2009. Data was analyzed using the SPSS statistical package.

Results: Of 165 donors, Hepatitis C virus antibody was positive in 6 donors. HIV screening was positive in one donor. These subjects were excluded from further evaluation. Hepatitis B virus serology was assessed for the remaining 158 donors. Virus Hepatitis B surface Antigen (HBsAg, required by both EBAA and EEBA) was negative in all these donors. However, Virus hepatitis B core total Antibody (HBc total antibody, required to be negative by EEBA only) was positive in 22/158 (13.9%). In 17 of these 22 donors hepatitis B core IgM antibody testing was performed, being negative in all cases.

Conclusions: In this cohort of cornea donors, a significant disagreement between the screening methods used by the EBAA and the EEBA was observed. According to EEBA standards, 13.9% of donors accepted by the EBAA would be considered unsuitable for transplantation. Further refining of screening methods is needed to determine optimal corneal donor usage.

A NOVEL TECHNIQUE: A DOUBLE USE OF A CORNEAL GRAFT FOR DESCEMET'S STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY AND COVERAGE OF GLAUCOMA DRAINAGE DEVICE TUBES

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Introduction: In glaucoma drainage device surgeries, the implant tube, as it runs along the sclera, is patched with a covering tissue to protect from tube erosion and potential infection. Several materials have been used for covering the tube: processed pericardium, preserved sclera, amniotic membrane, and corneal graft. The purpose of this study is to assess the efficacy and safety of a novel surgical technique for Ahmed glaucoma valve implantation (AGVI) surgery. In this surgical technique, the implant tube is patched with anterior corneal graft cap in which its posterior lamella was used for descemet's stripping automated endothelial keratoplasty (DSAEK).

Patients / Methods: The charts of all patients who underwent an AGVI surgery using the anterior lamella of a donor cornea, used for a previous DSAEK surgery, were retrospectively reviewed. The study period was November 2006 to September 2009. Demographic data, intraoperative complications and clinical examinations before and after the surgery were collected for each patient. Postoperative data were recorded from day 1, week 1, 1 month, 3 month and last follow-up after surgery.

Results: Twelve patients composed the study population. Mean age at surgery was 73.5 ± 10.9 years. Nine eyes (75%) had superotemporal valve implantation and 3 eyes (25%) had inferotemporal implantation. In all cases no intraoperative complications were encountered. Intraocular pressure (IOP) before surgery was 32.8 ± 9.3 mm Hg. Mean postoperative intraocular pressures were 13.2 ± 6.8 mm Hg ($P<0.001$) at day 1, 10.5 ± 2.9 mm Hg ($P<0.001$) at week 1, 12.7 ± 3.1 mm Hg ($P<0.001$) at month 1, 12.5 ± 3.2 mm Hg ($P<0.001$) at month 3 and 12.4 ± 4.7 mm Hg ($P<0.001$) at final visit. The mean reduction in IOP was 16.7 ± 6.4 mm Hg. None of the patients had hypotony (IOP < 5 mm HG) during follow-up period. No corneal graft-related complications such as graft rejection or tube exposure were documented. AGVI-related complications, such as diplopia or inflammatory reaction in the conjunctiva were not noted. Mean follow-up time was 8.4 ± 6.1 months.
Conclusions: The use of the anterior corneal graft cap for patching tube in AGVI is effective and safe.

DISCRIMINATING BETWEEN FASTER PERIPHERY AND SLOWER FOVEA USING ERP

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Introduction: : to investigate the relationship between the central vision, the fovea, and the peripheral parts of the visual field, and their discriminatory neurophysiological representation. Fovea and periphery are thought to rely on different physiological streams However, because usually both fovea and periphery are simultaneously stimulated, one would expect mutual modulations between the two representations in order to achieve a unified percept.

Patients / Methods: We measured ERP responses to different sizes of Gabor patches, occupying from strictly foveal (0.4 degrees) to a combined foveal and peripheral parts of the visual field (up to 14 degrees). Annuli (rings produced from a Gabor with the foveal opening filled with mean-luminance background) were used to stimulate the surround.

Results: The results show 3 main components representing the foveal and the peripheral processing. 1) P1-amplitude increased with increasing absolute area of stimuli, similarly to our findings for increasing contrasts. Moreover, it reflected a linear summation of sensory representation of complementary center and surround stimuli. However, surprisingly, the latency showed a faster processing in periphery than in the fovea. 2) P2-amplitude showed no linear summation between the two parts. However, latency showed significant additional gains in the speed of processing for the combination of center and surround, compared to the parts in isolation, suggesting that the periphery accelerates the processing of the fovea. 3) N2-amplitude showed no linear summation, but a step change from the strictly foveal to peripheral stimulation, despite the linear shortening of latencies with increasing stimulation area. Moreover, the difference in the amplitude for the peripheral stimulus vs. the one combining both fovea and periphery support our earlier suggestions that N2 reflects lateral interactions from the fovea. Surprisingly, stimulation of periphery increases the speed of foveal processing.

Conclusions: Our results suggest interactions between the representation of the fovea and the periphery, rather than an independent representation. The cortical representation of the fovea and the periphery are reflected by distinct ERP components. These neurophysiological markers provide a useful measure of the spatial extent for the distinct parts of the visual field.

CENTRAL CORNEAL THICKNESS IN NON-ARTERITIC ANTERIOR ISCHEMIC OPTIC NEUROPATHY PATIENTS IS NOT SIGNIFICANTLY DIFFERENT FROM NORMAL CONTROLS

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Introduction: Non arteritic anterior ischemic optic neuropathy (NA-AION) is the most common cause for acute optic neuropathy in the elderly. Small C/D ratio is considered an important risk factor for NA-AION. Also low hyperopia was found more prevalent in NA-AION patients compared to age matched controls. Both issues are related to eyeball structure. In literature search we did not find any studies that measured central corneal thickness (CCT) in NA-AION patients. Thick corneas might decrease eyeball flexibility and make it prone to such events.

Methods: Prospective clinical trial. Central corneal thickness was measured in 62 eyes of 31 patients with NA-AION. CCT was measured in an age matched control group of 18 participants (36 eyes). Inclusion criteria : age >40 years, H/O NA-AION diagnosed as acute visual loss, swollen disc, visual field defect that respects horizontal meridian. Exclusion criteria: Any intraocular or corneal surgery, or any corneal disease.

Results: The average of CCT of the NA-AION patients and the control group were 539.34+/-29.2µ and 550.04+/-29.8µ respectively . This difference was not statistically significant (P>0.05).

Conclusion: According to this study CCT in NA-AION patients is not significantly different from an age matched control group. CCT might not have a role in the pathogenesis of NA-AION.

REFRACTIVE PROFILE IN ALBINISM AND IT'S CORRELATION WITH VISUAL ACUITY

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Introduction: : Oculocutaneous albinism (OCA) comprises a group of autosomal recessive syndromes of hypopigmentation and low vision. Albinism is characterized by a block of eumelanin biosynthesis, resulting in the reduction or absence of melanin pigment in the skin, hair and eyes. Ocular manifestations include: hypopigmentation of iris and retina, hypoplasia of the macula, nystagmus, poor vision, photophobia and high refractive errors. OCA 1 results from a mutation in the tyrosinase gene, and includes the subtypes OCA 1-4. OCA 2 results from a mutation in the p gene, and Ocular albinism (OA) accounts for a reduction in pigment in the eyes only. Previous studies in albinos show a wide range of refractive errors (evaluated by auto refractometer), being astigmatism the most common one. In addition, results were calculated as spherical-equivalent,not reflecting the real prevalence of different refraction errors. The purpose of our study was to evaluate the correlation between refractive errors and final visual outcome in different types of albinism.

Patients / Methods: A retrospective study of 134 albinos, ranging in age from 0.5 to 35 years. Patients were divided in five different subgroups: OCA1 A, B and C, OCA 2 and OA. Refractive errors were evaluated objectively by cycloplegic refraction and subjectively in cooperative patients. Best corrected visual acuity was assessed binocularly. Refractive errors were divided into three groups: hypermetropia, myopia and astigmatism to avoid the use of spherical equivalent. Statistical analysis (Anova, T-test and chi-square tests) were used.

Results: Hypermetropia was the most frequent refractive error in all subtypes of albinism. High refractive errors were more prevalent in the OCA1A group (statistically significant). Astigmatism was the second most common refractive error in all subgroups. Poor visual outcome was more common in the OCA1A group.

Conclusions: Our study shows that high hypermetropia is the most common refractive error in all subtypes of albinism. OCA 1A group was associated with the poorest visual outcome and the highest hypermetropic error. These results may help clarifying the poorly understood process of lack of emmetropization in albino patients, and predicting visual outcome in this heterogeneous population.

FLUIDICS OF MICS

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Introduction: Purpose: To study the fluid dynamics of various techniques of micro-incision cataract surgery (MICS)

Patients / Methods: Fluidics of 3 techniques of MICS (Micro co-axial, Bi-manual and Tri-MICS) were studies in laboratory and clinical settings. Various types of anterior chamber maintainers (ACM) for the three-port Tri-MICS technique were investigated at a variety of parameters.

Results: Co-axial MICS can be safely performed through corneal incision of 1.8 mm and larger. Irrigating choppers provide sufficient fluid to perform surgery through a 1.2 mm and moderate aspiration. Most commercially available 20G ACMs do not provide sufficient irrigation unless the bottle is extremely high. A specifically designed (AVI) 19G ACM with a thin wall and large internal lumen provides the most efficient irrigation and effectively prevents post occlusion surge.

Conclusions: The AVI maintainer was the most efficient means for micro-incision (1.1 mm) surgery. Tri-MICS technique can be done using any phaco machine.

NEAR-INFRARED PHOTOACOUSTIC MEASUREMENTS IN THE AQUEOUS HUMOR

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Introduction: Use of near-infrared (NIR) photoacoustic spectroscopy (PAS) for detection of proteins in the aqueous humor (AH) is investigated. Recent studies showed correlation between changes in AH contents, in particular in the concentration and composition of proteins, to several ocular or systemic diseases, including uveitis and neurodegenerative diseases, such as Alzheimer's disease. The presence of disease-related proteins in the AH motivates the development of non-invasive and specific in-vivo methods for their detection and monitoring. PAS is based on measuring the acoustical signal generated due to the absorption of modulated light in a tested medium. The NIR spectral range offers a favorable tradeoff between eye-safety and penetration depth along with “fingerprint” spectra of proteins. The feasibility of PAS for the detection of absorbing particles in the AH is experimentally demonstrated.

Patients / Methods: Photoacoustic response of extracted ovine eyes was measured at excitation wavelengths in the NIR: 900nm, 1700nm and 1450nm, where the absorption coefficients of water are ~0.07, 5.2 and 26 cm-1 respectively. To emulate the presence of protein assemblies, suspension of graphite particles in saline was injected to the AH of some of the eyes. The setup comprised an Optical Parametric Oscillator (OPO), tunable in the NIR, whose beam was focused inside the AH. The detector was an ultrasonic transducer followed by a preamplifier whose output was sampled and averaged using an oscilloscope.

Results: Marked differences in the PAS responses of eyes with and without graphite suspension were observed. Each response included two peaks, the first was attributed to waves generated at the focal point closer to the detector and the second was attributed to photoacoustic generation at the cornea and the AH behind it at the entrance point of the optical beam. When the AH absorption increased, due to wavelength change or an addition of graphite suspension, the ratio between the peaks increased, since higher absorption resulted in a higher signal at the entrance point.

Conclusions: NIR PAS is a viable technique for detection of absorbing particles in the AH. The method can be potentially used for identification and monitoring of proteins in the eye.

VISUAL FIELD LEARNING ARTIFACT SIMULATING SCOTOMA IN THE BJERRUM AREA

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Introduction: In the Humphrey 30-2 and the 24-2 threshold tests, four paracentral points located at the corners of a 9-degree rectangular are initially tested (first threshold determination). Then, the threshold of these points is rechecked (second threshold determination). Finally, the rest of the field is tested. We studied 12 patients that presented with visual field defect involving solely these four points.

Patients / Methods: 30 threshold visual field tests of 12 subjects with visual field scotoma at any of the the four paracentral points located at the corners of a 9-degree rectangular were studied. All visual fields were performed with the automated Humphrey Zeiss perimeter. Subjects were tested with Fastpac, either 24-2 (six cases) or 30-2 (six cases). Three patients had repeat visual field testing.

Results: In each visual field, the most significant threshold depression was expressed in at least two of the four paracentral points, which are the first to be tested. The right eye (which was the first tested eye) was involved in 11/12 (92%) of the patients. The mean second threshold determination of the 4 points was significantly higher ($p=0.001$) than the first (mean 27.3DB and 21.8DB respectively). In 10/12 of the threshold fields, the second determination of the mean threshold for the 4 points was higher than the first determination by 3 DB or more. None of the patients had a higher first threshold determination. Information regarding history of visual field testing was available in nine cases. In all nine this test was the first ever visual field test to be performed. To confirm that this defect was a learning artifact, visual field testing was repeated in three of the patients and was normal in all three.

Conclusions: When a field defect is restricted to any of the four paracentral first tested points, a learning artifact should be suspected. It is important to recognize this artifact, since such a defect could be incorrectly interpreted as scotoma in the Bjerrum area, and may lead to false diagnosis of early glaucomatous damage. Normal visual field on repeat testing can confirm the nature of this visual field artifact.

RETINECTOMY FOR ANTERIOR SEVERE PVR. DID THE PROGNOSIS HAVE CHANGED WITH MODERN VITREORETINAL SURGERY?

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Introduction: to asses the long term results and complications of retinectomy for Rhegmatogenous retinal detachment (RRD) due to severe PVR.

Patients / Methods: sixty-six consecutive eyes diagnosed as having RRD with anterior PVR stage C2 or worse underwent retinectomy and silicone oil injection. Follow-up was at least 4 months.

Results: At the end of the follow-up 48/66 (72.7%) eyes had an attached retina with oil removal. In 12/66 (18.2%) eyes silicone oil had not been removed. The mean number of interventions on the retina not including silicone oil removal was 1.18 interventions (0-3). VA was more than 20/200 in 16/48 (33.3%) eyes. In those eyes IOP was >6 mm Hg in 34/48 (70.8%) of the cases.

Conclusions: Retinectomy is quite a simple and quick procedure that is used in severe anterior PVR. Although improvements in vitreoretinal surgery, the prognosis did not change much in the last years. It is advisable to use retinectomy as a last resort.

THE INFLUENCE OF DIFFERENT METHODS FOR EPITHELIAL LAYER REMOVAL ON PRK PATIENTS" SATISFACTION

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Introduction: This study evaluates the influence of three different methods for epithelial layer removal on the visual acuity of patients, in the first month after PRK (Photo Refractive Keratectomy) procedure.

Patients / Methods: The study has been conducted on 300 consecutive eyes (170 patients) that underwent a PRK procedure between 1.10-31.12.2008, using the Allegretto Wavelight200Hz platform in our institution. The inclusion criteria were: age 18-35y old, refraction: 0-8D sph, up to 2D cyl, preop BCVA of 1.0 (6/6). Three different schemes for removal of the epithelial layers were examined: GROUP A: 116 eyes underwent a manual epithelial removal of 8-9 mm using a hockey knife. GROUP B: 119 eyes underwent an epithelial removal of 8-9 mm with the application of 20%alcohol for ~15 seconds. GROUP C: 65 eyes underwent a PTK (Photo Therapeutic Keratectomy) of 50 mic. procedure for the epithelial removal, using a treatment zone matching the PRK treatment zone (between 6-6.5 mm optical zone). The visual acuity of the patients was evaluated for all three groups one month after the surgical procedure. A comparison between the three groups has been conducted using the efficacy index (EI) = UCVA postoperative/BCVA preoperative.

Results: The PTK-PRK (PTRK) group showed an unequivocal significant advantage with an EI of 0.98 as compared with 0.83 for the alcohol group and only 0.73 for the manual group. More elaborated data regarding the evaluation of the first days pain score, the 6 months stability of the results as well as the scientifical basis for the advantages of the PTRK procedure will be presented.

Conclusions: : The last decade in refractive surgery was characterized by a return to the surface ablation procedures due to the complications that emerged with Lasik. Nonetheless, because PRK patients still suffer from significant pain and a slow visual acuity recovery, the "wow effect" of Lasik is hard to beat. The PTRK emerges as a safe, simple and accurate alternative.

Session II – Glaucoma, Oncology, other

A PRELIMINARY EVALUATION OF A PUPILLOMETER-BASED OBJECTIVE CHROMATIC PRIMETRY

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Purpose: Exploring the possibility of using the Pupillary Light Reflex (PLR) for objective perimetry. PLR is currently used to evaluate visual functions in a full field mode. In this study we used PLR in a novel way - Pupillometer-based objective chromatic perimetry.

Methods: We used a pupillometer [Ronald Consult, Germany] attached to a Goldmann perimeter to measure the dark adapted PLR of seven normal individuals and five retinitis pigmentosa (RP) patients. Pupillary diameter changes were measured in each of thirteen different visual field points for short and long wavelength stimuli (peak 485 nm and 620 nm respectively). All stimuli were size V3c, at light intensity of 39.8 cd-s/m2 and duration of 1000 ms. Ratios of the PLR diameter for the short and long wavelengths were calculated for each spot.

Results: The average of the PLR ratio in the normal subjects was 0.41 + 0.2 (Average + SD). The average of the PLR ratio measurements of the patients in the seeing area of the visual fields was 0.62 + 0.25 and in the non-seeing area 0.97 + 0.2. The PRL ratio was significantly different between the normal subject and the RP patients and between seeing areas and non-seeing areas in the visual fields of the RP patients (ANOVA, $p<0.001$).

Conclusions: The PLR ratios of the short and long wavelength stimuli were significantly higher in areas of visual field defects in RP patients. Pupillometer-based chromatic perimetry may possibly be used to objectively measure visual field defects.

CARBON DIOXIDE LASER-ASSISTED DEEP SCLERECTOMY (LADS): A PROSPECTIVE CLINICAL STUDY

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Purpose: To evaluate the safety and efficacy of CO2 Laser-based Deep Sclerectomy (LADS) surgery for the treatment of primary or pseudoexfoliative open angle glaucoma.

Methods: LADS surgery was performed on glaucoma patients with baseline Intra-ocular pressure (IOP) ≥18 mmHg on maximally tolerated medical treatment, using CO2 laser and the IOPtimate™ system (OT-134, IOPtima Ltd, Ramat-Gan, Israel) in Mexico, India and Russia. In this self-regulated procedure, the sclera is gradually ablated over the Schlemm's canal and trabecular meshwork while preserving an intact trabeculo-Descemet's membrane, resulting in aqueous percolation. IOP, the number of anti-glaucoma medications per patient and surgical and post-operative complications were recorded during 12 months.

Results: Thirty seven patients were enrolled, 29 completed 12 months of follow up. Adequate aqueous percolation was achieved in all cases. Mean IOP dropped from 26.6±7.8 mmHg preoperatively to 14.4 ±3.4 mmHg and 14.2±3.0 mmHg at 6 and 12 months after surgery, respectively ($p<0.0001$). Average hypotensive medications use per subject was reduced from 2.4±0.9 to 0.6±0.8 ($p<0.0001$). There were no device-related intra-operative complications. Most post-operative complications were mild and transitory.

Conclusions: Short and intermediate results show that CO2 LADS is a safe, effective and simple surgical procedure for the treatment of open-angle glaucoma.

PREVALENCE AND RISK FACTORS FOR CONJUNCTIVAL BACTERIAL COLONIZATION IN ADULT PATIENTS UNDERGOING ELECTIVE INTRAOCULAR SURGERY

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Introduction: Preoperative prophylactic therapy is applied to the conjunctival sac before ocular surgeries in order to prevent post-operative endophthalmitis. The aim this study was to determine the prevalence of conjunctival bacterial colonization, and associated risk factors in adult patients prior to elective intraocular surgery.

Patients / Methods: The study was conducted at Ha'Emek Medical Center, Afula, between May 2006 and August t 2007. Conjunctival cultures were obtained from all adult patients undergoing elective intraocular surgery, prior to application of prophylactic therapy to the conjunctival sac. Cultures were processed using standard routine microbiology techniques. Demographic, socioeconomic and medical data of our patient cohort was obtained and compared to culture results.

Results: Cultures were obtained from 501 patients with a mean age of 69.7. Bacterial growth was detected in 203(40.5%) of patients. Coagulase-negative Staphylococcus (CNS) grew in 170 (34%), Streptococcus viridans in 14 (2.8%), and methicillin sensitive Stapylococcus aureus in 14(2.8%). 175(35%) of patients had one type of bacterial growth whereas 28(5.6%) of patients cultured two or more pathogens. Univariate analysis demonstrated significant risk factors for mixed pathogens colonization being spring or summer season (OR: 1.66, 95% CI: 1.17-2.37) and preoperative showering (OR: 1.72, 95% CI: 1.11-2.66) whilst patients with hypertension had reduced risk (0.64, 95% CI: 0.44-0.91). Multivariate analysis determined that preoperative showering (OR: 1.76, 95% CI: 1.12-2.77), spring/summer seasons (OR: 1.55, 95% CI: 1.06-2.26) and lack of formal education (OR: 1.62, 95% CI: 1.01-2.60) as significant risk factors for mixed bacterial growth.

Conclusions: Most patients had sterile conjunctiva before the surgery. CNS was the most prevalent bacterial yield in the conjunctival sac. Risk factors for mixed conjunctival bacterial growth were a) surgery during spring/summer season, b) showering before operation, and c) lack of formal education. Hypertensive patients had reduced risk for mixed conjunctival growth.

CALCIFICATIONS IN RETINOBLASTOMA. HISTOLOGIC FINDINGS AND STATISTICAL ANALYSIS OF 302 CASES

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Introduction: Dystrophic calcification is encountered mostly in areas of necrosis. Calcification in retinoblastoma is a frequent histologic finding with a reported frequency between 50 % and 95 %, although the subject has not been studied in depth. To the best of our knowledge, no previous studies have addressed the relationship between calcifications and other histologic features in retinoblastoma. The purpose of the present study is to evaluate the histological factors that may affect the development of calcifications in eyes with retinoblastoma.

Patients / Methods: Three hundred and two enucleated eyes examined at the Ophthalmic Pathology Laboratory at the Hadassah-Hebrew University Medical Center, Jerusalem, Israel, between the years 1960 and 2008, were retrospectively reviewed. Histologic slides were evaluated for the presence and degree of calcifications as well for other histologic features. Univariate and multivariate statistical analyses were performed to search for a possible correlation between calcifications and the other histologic factors.

Results: Calcification was present in 84.9 % of cases. Age, tumor size, necrosis, basophilic staining, iris neovascularization, choroidal, scleral and/or optic nerve invasion were correlated significantly with calcifications. Multivariate analysis showed a significant correlation between the presence of calcifications and the amount of necrosis and choroidal invasion only.

Conclusions: In our series calcifications were more frequent in cases with more necrosis and cases with choroidal invasion. The possible clinical implication of our findings deserves additional studies.

CARCINOEMBRYONIC ANTIGEN- RELATED CELL ADHESION MOLECULE-1 (CEACAM-1) IN POSTERIOR UVEAL MELANOMA: CORRELATION WITH CLINICAL AND HISTOLOGICAL SURVIVAL MARKERS

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Introduction: Carcinoembryonic antigen-related cell adhesion molecule-1 (CEACAM1) is a novel protein that has been recently recognized as being expressed by immune cells. It appears to function as a coinhibitory receptor after T cell activation. In addition, CEACAM1 expression was found to be upregulated by cutaneous melanoma cells conferring thus resistance against Tumor-Infiltrating Lymphocytes. This melanoma-promoting role of CEACAM1 makes it a potential target for immunotherapeutic interventions. The aim of this study was to examine the expression of CEACAM1 in uveal melanoma and to correlate it with clinicopathologic parameters.

Patients / Methods: CEACAM1 expression was immunohistochemically evaluated in primary tumors of 80 patients who underwent enucleation at Hadassah-Hebrew University Hospital between the years (1986-2006). Twenty-one liver sections were also stained.

Results: Thirty-nine tumors were from females; age range was between 19 and 86 years (mean 61. 47 y). Thirty-six tumors were CEACAM1 positive whereas 44 were CEACAM1 negative. Of the epithelioid-type tumors (n=23), 16 were CEACAM1 positive (69.6%) whereas of the spindle-type tumors (n=17), 13 were CEACAM1 negative (76.5%) (p=0.01). With regard to the extravascular matrix pattern; of the silent pattern (n=18), 16 were CEACAM1 negative (88.9%) whereas of the network pattern (n= 16), 12 were CEACAM1 positive (75%) (p=0.007). Mean tumor diameter was 15.6 mm ±SD 3.2 for CEACAM1 negative tumors, whereas it was 12.6 mm ± SD 4.5 for CEACAM1 positive tumors (p=0.002). A similar non-significant trend was noted for mean tumor height, where it was 10.68 mm ± SD 3.7 for CEACAM1 negative tumors and 9.35 mm ± SD 3.5 for CEACAM1 positive tumors. In patients who developed liver metastasis (n=33), 18 were CEACAM1 positive (54.5%) whereas in patients without metastasis (n=24), 15 were CEACAM1 negative (62.5%) (p=0.2). No information was available on the remaining 23 patients. Twenty-one liver metastatic sections were also studied; 17 were found to positively express CEACAM1.

Conclusions: CEACAM1 is expressed in uveal melanoma. Correlation with poor prognostic factors like epithelioid cell type and network extravascular matrix pattern was found. Additional validation studies on the use of CEACAM1 expression as a prognostic marker are warranted.

OCULAR SARCOIDOSIS CAN BE EXCLUDED BY ANALYSIS OF T CELL SUBSETS IN INDUCED SPUTUM

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Introduction: The aim of this study was to establish a correlation between the diagnosis of ocular sarcoidosis and an elevated CD4/CD8 ratio (CD4 helper T lymphocytes)/CD8 (suppressor-cytotoxic T lymphocytes) in the induced sputum (IS) of symptom-free patients with uveitis.
Patients / Methods: We retrospectively reviewed the medical records of 46 new uveitis patients (age range 18-85 years; 20 males) referred to the Ophthalmology Department of Tel-Aviv Medical Center between 1998-2006. IS was performed by conventional methods, and angiotensin-converting enzyme (ACE) levels were determined by radioactive assay. A CD4/CD8 ratio >2.5 and an ACE level >145 μl/ml/min were considered to be abnormal. The etiology of uveitis (sarcoidosis, other systemic disease, ocular disease or idiopathic) was retrieved and recorded.
Results: Average follow-up time was 3.5+/-2.2 years. The CD4/CD8 ratio in IS samples was elevated in 26 (56.5%) patients. Five (10.87%) patients with uveitis were diagnosed as having sarcoidosis during follow-up. The sensitivity and specificity of IS-determined T lymphocyte CD4/CD8 ratios in the sarcoidosis group were 100% and 49%, respectively. CD4/CD8 ratios were similar between the patient groups (P>0.05), however, there was a tendency towards higher values in patients with ocular sarcoidosis (3.8+/-0.95) than in non-sarcoid patients (2.53+/-1.65, P=0.0991). The ACE level in sarcoid patients (192.4+/-50.24 μl/ml/min) was significantly higher than that of all other patients combined (121.92+/-38.69 μl/ml/min, P<0.001). The correlation between an elevated CD4/CD8 ratio and an increased ACE level had borderline significance for all subjects (P=0.056).
Conclusions: The CD4/CD8 lymphocyte ratio obtained by IS was highly sensitive in patients with uveitis diagnosed as having sarcoidosis. This finding suggests that analysis of T cell subsets in IS may be useful in ruling out sarcoidosis in newly diagnosed uveitis patients. The low specificity of this ratio in diagnosing sarcoidosis may suggest that other conditions (mostly non-infectious inflammatory ones) might have caused an elevated CD4/CD8 ratio. These findings support the determination of serum ACE levels in the diagnosis of ocular sarcoidosis. In the absence of definitive noninvasive laboratory tests for ocular sarcoidosis, subpopulations of T lymphocytes in the IS may provide a new noninvasive diagnostic tool to be used in combination with other clinical parameters to establish the diagnosis.

ENDOSCOPIC DIODE LASER DCR: RESULTS OF A CASE SERIES IN TWO CENTERS

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Introduction: To present the surgical technique, and sequelae of fifteen DCR operations in thirteen patients using Endoscopic Diode Laser DCR.

Patients / Methods: Fifteen DCR's were performed by two separate surgeon teams in two different centers using the same diode laser device. Fourteen operations were for primary aquired nasolacrimal obstruction and one operation for traumatic nasolacrimal obstruction. In one center cases were performed using general and local anaesthetic (9) and in the second center using general anaesthetic only. Initial opening of the sack was performed through the upper canaliculus with widening of the opening through the lower canaliculus. No mitomycin C was applied. Follow up was over one year in all cases.

Results: Twelve DCR's (80%) of the fifteen were success. Both cases where bilateral DCR was performed and the case of traumatic nasolacrimal duct obstruction were successful. Failure was diagnosed in three cases within three months of surgery . All three failed were all reoperated with a successful result. Two cases 13% where local anaesthetic was injected had a periorbital hematoma postoperatively.

Conclusions: DCR using Endoscopic Diode laser technique without application of Mitomycin C gives an 80% success rate. The procedure is simple and there is no problem of bleeding postoperatively. Periorbital hematoma occurred only in cases where local anaesthetic was injected. Reoperation of three failed cases using external approach DCR was not complicated and all had successful outcomes.

Session III – Poster presentations 2

INFLUENCE OF MINOCYCLINE ON LASER INDUCED RETINAL DAMAGE IN RATS

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Introduction: The retinal damage induced by laser photocoagulation is amplified by secondary degeneration and apoptotic processes with additional damage to tissues adjacent to the primary lesion. The histological and functional consequences of this spread can be ameliorated by neuroprotection. Minocycline is semi synthetic tetracycline antibiotic that has multiple biological effects: immunomodulatory, anti-inflammatory and neuroprotective. Neuroprotection of the retina by minocycline was reported in rat models with light induced retinal degeneration. However, to-date no in vivo minocycline mediated retinal neuroprotection studies were reported in models with laser induced retinal damage. Purpose: To test the neuroprotective effect of systemic administration of minocycline on the laser-induced retinal damage.

Patients / Methods: Standard argon laser lesions (514 nm, 200 µm, 0.1 W, 0.05 second) were created in 36 DA pigmented rats, that were divided into 3 paired minocycline/saline-control time groups (n=12 for each). Immediately after photocoagulation, intraperitoneal injections of minocycline or saline were made and the injections were continued daily until sacrificing. The first group was sacrificed on the third day after photocoagulation, the second and third were sacrificed after 20 and 60 days respectively. The lesions were evaluated histologically and morphometrically.

Results: Intraperitoneal injections of minocycline had no neuroprotective effect on both laser lesion diameter and amount of photoreceptor loss at all the time points.

Conclusions: In our rat model of laser induced retinal lesions the systemic treatment with minocycline had no neuroprotective effect. This is conversely to previous reports about neuroprotection against retinal damage induced by light. It is possible that neuroprotective effects of minocycline are not strong enough to overpower severe thermal retinal injury induced by laser. The neuroprotection effect of minocycline on the laser induced retinal injury should also be evaluated when delivered intravitreally.

INTRAVITREAL INJECTION OF ADULT BONE MARROW DERIVED STEM CELLS TO DEVELOPING RETINA OF NEWBORN MICE

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Introduction: Bone marrow cells have been shown to home to sites of injury and participate in the process of remodeling after injury. The smallest population of nucleated bone marrow cells has been shown to differentiae into a range of epithelial tissues, liver, endothelium and insulin-producing cells, in addition to long-term hematopoietic reconstituting potential. The retina, under physiological conditions, continues to develop 3 weeks post partum, to complete neurogenesis and angiogenesis. To determine whether these cells can contribute to the retina in the absence of injury and inflammation, we conceived that the neonatal eye would be the most favorable environment for such incorporation and differentiation. Therefore, we seek to determine the participation of this subset of candidate multipotent cells to retinal modeling after birth.

Patients / Methods: Adult bone marrow cells were isolated by counterflow centrifugal elutriation that separates a subset accounting for 8-14% of the bone marrow cells at a flow rate of 25 ml/min (Fr25). To obtain a hematopoietic lineage-negative fraction (Fr25lin-), immunomagnetic depletion was performed for Ter-119 (erythrocytes), GR-1 (granulocytes), Mac-1 (macrophages), NK1.1 (natural killer cells), CD3 (T cells) and B220 (B lymphocytes). The obtained cells were counted, tested for viability and suspended in PBS for injection. Intraocular injection of 200X105 WBMC or Fr25lin- to neonate mice aged 4-12 days was performed under isoflurane anesthesia.

Results: Donors cells that constitutively express GFP were detected in the neonate eyes 1 month following transplantation of either WBMC or Fr25lin- cells. The cells that incorporated into the developing retinae were mainly located in the RGC layer and showed green cytoplasm. Differentiation studies demonstrated neuronal and glial, but not inflammatory markers.

Conclusions: Neonates survived intraocular injection of putative stem cells from GFP+ adult bone marrow donors. The eyes maintained their normal anatomy. A few cells, which were incorporated into the retina, as detected 1 month following transplantation, demonstrated neuronal and glial differentiation. The survival and differentiation of the GFP + cells for longer than 6 months is currently under investigation.

THE POSSIBLE NEUROPROTECTIVE EFFECT OF ROY PEPETIDE LIGATION TO MEMBRANAL GRP78 IN THE ISCHEMIC RETINA

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Introduction: Optic nerve injury causes severe axonal damage leading to apoptosis of the retinal ganglion cells (RGCs) and consequent loss of vision. GRP78, a well-characterized endoplasmic reticulum (ER) chaperone, is present in all cells and plays an important role as one of the initial components of the signaling cascade that produces the unfolded protein response. In this study, we would like to evaluate the neuroprotective effect of intravitreal injection of RoY, a 12 amino-acid peptide that identified GRP78 following induction of retinal ischemia in mice, by crush. This connection is increased under hypoxic conditions and is related to increased cell survival.

Patients / Methods: Fifteen C57BL mice underwent right optic nerve crush immediately followed by intraocular RoY peptid injection (n=10) or saline (n=5). The left eyes were untreated and served as controls. Another control group underwent injection of RoY peptide to a normal non injured eye (n=5). All the mice were analyzed histologically 21 days following the injury.

Results: Mean RGC cell loss on day 21 was 53% in the group after crush injury without injection of the peptide. In the intraocular injected RoY post crush, the cell loss was reduced to 27%. No RGC loss was measured in the control group injected with RoY.

Conclusions: Histologically, we have demonstrated a neuroprotective effect of intraocular RoY injection. The peptide prevented RGC loss after optic nerve crush injury. These results encourage further studies of the mechanism and clinical uses of the agent.

GROWTH FACTORS ENHANCE THE DIFFERENTIATION OF ADULT BONE MARROW DERIVED STEM CELLS IN ISCHEMIC MURINE RETINA

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Introduction: We have previously observed the efficient incorporation of adult bone marrow-derived stem cells (aBMSC) in the retina following the induction of acute ischemic optic neuropathy (AION). To evaluate the potential of aBMSC to reconstitute the injured retina, we assessed the possibility of enhancing incorporation as well as directing the differentiation of the cells by the local intravitreal administration of neuronal and vascular growth factors, vascular endothelial growth factor (VEGF), brain derived neurotrophic factor (BDNF), and ciliary neurotrophic factor (CNTF).

Patients / Methods: Injury was induced by the photoactivation of Rose-Bengal over the optic disk, causing retinal ganglion cell (RGC) loss. The smallest subset of nucleated bone marrow cells (Fraction 25) were collected by counterflow centrifugal elutriation and depleted of cells expressing lineage markers (Fr25Lin-). The candidate stem cells were injected intravitreously or intravenously. Subsequently, BDNF, CNTF or VEGF were directly administered into the vitreous body.

Results: Only a few cells were incorporated into the injured retina, mainly to the inner layers, in the absence of growth factors. These cells displayed various differentiation markers as determined by the co-localization of donor markers (GFP and Y chromosome). In the BDNF-, CNTF- and VEGF-treated eyes, GFP+ aBMSC were incorporated preferentially into the RGC layer and displayed neuronal markers. Few of the retina-engrafted cells were GFAP-positive astrocytes, as determined by their shape, location and markers. Some were engulfing endothelial cells. None of the cells showed inflammatory lineage differentiation. All the growth factors increased neuronal-glial differentiation. No angiogenesis was detected following intravitreal VEGF injection. The incorporation at the blood vessel walls was mainly characterized as glia, supporting the blood brain barrier in the retina.

Conclusions: Microenvironmental alterations in acute ischemic optic neuropathy lead to RGC loss and facilitate homing and incorporation of stem cells to the injured retina. Intravitreal injection of VEGF, BDNF or CNTF increased the efficacy of donor cell incorporation and enhanced neuronal and glial differentiation. These data demonstrate that aBMSC participate in retinal regeneration through neogenesis of neurons and supporting glial cells, expressing the specific lineages markers as a feature of developmental plasticity.

THE ROLE OF RASSF1A IN UVEAL MELANOMA

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Introduction: Uveal melanoma (UM) is the most common intraocular tumor, with mortality from liver metastasis in up to 50% of cases. It is not yet possible to predict those that will die from metastasis. RASSF1A, a tumor suppressor gene, plays a role in the tumorigenesis of UM. Inactivation of RASSF1A by epigenetic methylation may affect UM patients' prognosis and outcome. To investigate the role of RASSF1A in the development of UM and risk of liver metastasis, we examined a UM cell line proliferation after injection to mice, following exogenous activation of RASFF1A.
Patients / Methods: RASSF1A was found to be inactivated in the UM paternal cell line. The cells were transfected with exogenous RASSF1A-containing plasmid or empty plasmid. The transfected cells were injected subcutaneously or intraocularly, into male 5-6 week-old athymic BALB/c nude mice. Three experimental groups received the following cells: (1) the parental non-transfected UM cell line; (2) the empty pcDNA3.1 vector-transfected cells from the same parental origin; (3) the RASSF1A-pcDNA3.1-transfected cells from the same parental origin. The tumors were measured with calipers twice a week. Tumor volume was calculated and the mice were sacrificed once the tumors reached 1500 mm3 or 45 days. Tumor tissues, eyes, and livers were analysed histologically by hematoxylen-eosin staining. The expression of the RASSF1A gene was examined in the tumor samples using Real-time-PCR.
Results: Cell lines transfected with exogeneous expressing RASSF1A plasmid did not cause intraocular tumors, and the subcutaneous tumors were delayed and smaller, as compared to paternal UM cell-lines and cells transfected with empty vector. Regardless of tumor size, none of the groups developed liver metastasis.
Conclusions: In the presence of activated RASFF1A, the cells demonstrated reduced tumorigenicity potential. Subcutaneous tumors were smaller and no intraocular tumor was detected. The lack of liver metastasis in all groups might be due to the short period of the experiments (45 days). We therefore conclude that RASSF1A has an important role in the development of UM. Its activation may be used for developing future treatments.

THE HAPTOGLOBIN GENOTYPE DOES NOT AFFECT EARLY ONSET OF TYPE 2 DIABETIC RETINOPATHY

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Introduction: Diabetic retinopathy (DR) is a duration-dependent complication affecting 90% of type-2 Diabetes Mellitus (DM-2) patients over a period of 25 years. Genetic factors also influence its existence and severity. Haptoglobin (Hp) prevents oxidative stress by reducing plasma free hemoglobin (Hb). HP encoded by 2 alleles, Hp1 and Hp2, which gives rise to 3 genotypes: Hp1-1, Hp2-2, Hp1-2. The Hp2-2 genotype is associated with exacerbating cardiovascular morbidity, while the Hp1-1 is considered protective. The aim of the study is to assess the association of the Hp genotype and DR severity in DM-2 patients.
Patients / Methods: A controlled case study involving two groups of type-2 DM: severe retinopathy group (PDR) that developed severe DR within 10 years of the disease, and a non retinopathy group (NPDR) in which none or mild retinopathy was detected following at least 10 years duration of DM. All patients underwent a structured interview, medical records review, complete retinal evaluation and Hp genotyping. Genomic DNA from blood samples was extracted, and polymerase chain reactions were used to genotype Hp.
Results: NPDR group included 82 patients while PDR only 14 subjects. The distribution of Hp 1-1, 1-2, and 2-2 genotypes was 28.6%, 35.7% and 35.7%, respectively, among PDR and 24.4%, 26.7%, 48.9% among NPDR patients, respectively, with no significant statistical difference between the 2 groups. PDR patients were predominantly male, young, though older on DM onset, less physically active, demonstrating higher insulin treated rate and reduced glycemic control. The PDR group exhibited higher co-morbidity of stroke, peripheral vascular disease and nephropathy.
Conclusions: Our preliminary results indicate that the Hp genotype distribution is not specifically linked to type 2 diabetic retinopathy. Surprisingly Hp 2-2 was predominant in the NPDR No correlation to cardio- or peripheral vascular disease was found. Other genetic factors rather than age, duration and disease control might contribute to the retinopathy onset and severity.

MOLECULAR CHARACTERIZATION OF CERKL: A GENE UNDERLYING AUTOSOMAL RECESSIVE SEVERE RETINAL DEGENERATION WITH EARLY MACULAR INVOLVEMENT

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Introduction: CERKL is a novel gene encoding for a ceramide kinase-like protein. CERKL mutations lead to severe retinal degeneration with early macular involvement. Cerkl is expressed in the mouse retina. However, its specific expression pattern within the retina, whether it possesses a kinase activity, and what is the identity of its substrates is currently unclear.

Patients / Methods: RT-PCR analysis was conducted in order to assess the expression levels of Cerkl in the developing mouse eye as well as to reveal the unique splice variants of Cerkl in the mouse retina. In order to generate a specific antibody against CERKL, two short peptides (15 a.a each) located in specific CERKL regions were selected, synthesized and injected to rabbits. The immune-serum was affinity purified and specificity was tested using a western blot. In order to locate the expression pattern, we immune-stained paraffin sections of mature mouse eye with the anti-CERKL antibody.

Results: RT-PCR was performed on total eye RNA to examine the expression levels of Cerkl versus Cerk in mouse brain comparing to mouse retina. The two tissues showed similar expression levels of Cerkl but differed in the expression of Cerk, which was highly expressed in the brain but barely detected in the retina. We also found that Cerkl was expressed as early as embryonic day 14 in the mouse eye. Bioinformatic analysis of the human and mouse CERKL genes showed a strong homology between the exons. RT- PCR amplification of mature and E14 mouse retinal RNA revealed eight different Cerkl splice-variants, which differ in the length of the expected protein products and the existence of the DAGK and CERK domains. Immune-staining of mouse retinal sections revealed CERKL to be expressed mainly in the cone photoreceptors, amacrine cells and ganglion cell layer.

Conclusions: Cerkl expression begins early in the development of the mouse eye. The four different Cerkl splice-isoforms in the mouse retina may represent various roles of the protein in the eye. Studies of CERKL spatial and temporal expression patterns and characterization of CERKL biochemical properties will advance our knowledge regarding the role of this protein in retinal function and disease.

CORTACTIN AND ITS TYROSINE-PHOSPHORYLATED ISOFORMS IN OCULAR TISSUE

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Introduction: Cortactin (p80/p85) is expressed in nearly all mammalian tissues, serving as an actin-associated protein responsible for nucleating the actin filament assembly. The role of cortactin in actin cytoskeleton organization involves phosphorylation of tyrosine residues 421 and 466. Recently we have demonstrated that in confluent cultures of bovine corneal endothelial cells cortactin is localized at cell-cell contacts and phosphorylated at Y421 on p80 and at Y466 on p85. The present study was aimed to explore the expression of cortactin and its tyrosine-phosphorylated isoforms in ocular tissue.

Patients / Methods: Immuno-histochemistry of paraffin embedded tissues using specific anti-cortactin and anti-pY421- and pY466-cortactin antibodies.

Results: Cortactin was observed in the following ocular tissues: (i) corneal endothelium; (ii) corneal epithelium – mainly basal and wing cells; (iii) retina layers (excluding the layers containing nuclei) – nerve fiber layer, inner and outer plexiform layers, external limiting membrane and the segments of the photoreceptors; (iv) conjunctival epithelium; (v) hair follicles of the eyelids – the internal and external root sheaths. Phosphorylated cortactin at Y421 was observed in all corneal, hair follicle and retina layers expressing cortactin, with unique significant expression at the external limiting membrane. On the other hand, phosphorylated cortactin at Y466 is found only in corneal endothelium and the hair follicle external root sheath. In pathological conditions the appearance of cortactin is modified as follow: (i) keratoconus - changes in morphology are associated with partial disappearance of cortactin in the corneal epithelium; (ii) conjunctival dysplasia - cortactin is highly expressed in the epithelium; (iii) capillary haemangioma - the proliferating endothelium heavily express cortactin and its pY421 isoform.

Conclusions: This study demonstrates preferential expression of cortactin and its tyrosine-phosphorylated isoforms in endothelium, epithelium, and the retina layers excluding the layers containing nuclei. Pathological conditions modify cortactin expression suggesting specific role(s) for cortactin in ocular tissue that should be further explored.

A MUTATION OF THE PDE6G GENE CAUSES AUTOSOMAL RECESSIVE RETINITIS PIGMENTOSA

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Introduction: Retinitis pigmentosa is the most common form of hereditary retinal degeneration, with a worldwide prevalence of 1: 4,000. Over 30 genes and loci have been implicated in nonsyndromic autosomal recessive RP (arRP). Our purpose was to investigate the genetic basis for arRP in a consanguineous Israeli Muslim Arab family.

Patients / Methods: Whole-genome homozygosity mapping was conducted in four affected family members. Haplotype analysis with microsatellite repeat markers linked to the identified locus was performed in additional family members. Candidate genes located within this locus were screened for mutations by direct sequencing.

Results: The only homozygous region shared among all four affected individuals in this family was a 2Mb interval on chromosome 17q25.3. Among the genes located in this interval two were considered as candidates: FSCN2, which is associated with autosomal dominant RP, and PDE6G, encoding for the inhibitory subunit of rod photoreceptor cyclic GMP-phosphodiesterase (PDE). Mutations in the genes encoding for the catalytic subunits of this holoenzyme, PDE6A and PDE6B, cause arRP. Sequencing of all coding exons, including exon-intron boundaries, revealed a homozygous single base change (c.G187+1G>T) located in the conserved intron 3 donor splice site of PDE6G. This mutation co-segregated with the disease in the family. We are currently further evaluating this mutation in terms of its carrier frequency and its effect on splicing in vitro.

Conclusions: This is the first report of a PDE6G mutation as a cause for RP.

THE USE OF BIOLOGICAL ADHESIVE IN LAMELLAR CORNEAL GRAFT

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Introduction: The tradition way to treat corneal opacities is by performing corneal graft. Keeping the endothelium in lamellar graft is the best option for diseases which do not affect the endothelium and enable removing only the sick part of the cornea. The graft is sutured with 10/0 nylon sutures. Suturing is a long procedure which force long follow up for removing the sutures and might be a source of infection, irritation and neovascularisation of the cornea. Using adhesive material instead, or in combination with, sutures might simplify the procedure and improve it with less side effects

Patients / Methods: We divided our study to 2 stages. The first stage was in vitro study. The concentration of the different components was changed and each combination of concentrations was examined and compared to other concentrations in order to find the strongest combination. A bovine cornea was cut between the epithelium and the endothelium into two pieces. One part was connected to a stable surface and the other part to a light small glass. The two parts were connected using the adhesive and the power needed to separate them was recorded. The second stage was in vivo. Six rabbits were operated doing lamellar graft. Two controls with sutures and no adhesive and 4 with the use of the adhesive and 8,4,2, or 0 sutures. All rabbits received the same treatment, although some had deep lamellar graft with a donor from another rabbit and some an autograft superficial graft. The rabbits were sacrificed after 8-16 weeks and the corneas were examined.

Results: Except for one rabbit with the 2 sutures and adhesive all grafts remained in place. One control with sutures and no adhesive had endophthalmitis from the sutures. Hystological examination didn't show any remnant of the adhesive or an inflammatory reaction to the glue.

Conclusions: The biological adhesive is very well tolerated by in the rabit cornea and has potential to replace, or reduce the number, the classic sutures used in lamellar corneal graft.

A HOMOZYGOUS NONSENSE MUTATION IN THE TRPM1 GENE CAUSES AUTOSOMAL RECESSIVE CONGENITAL STATIONARY NIGHT BLINDNESS IN THE MUSLIM POPULATION

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Introduction: Autosomal recessive (AR) congenital stationary night blindness (CSNB) is a heterogeneous inherited retinal disorder caused by mutations in 5 genes. In this study, we investigated the genetic basis of disease in patients with AR inheritance of CSNB, usually accompanied by reduced visual acuity.

Patients / Methods: Patients from 20 families with the diagnosis of CSNB were recruited for the study. Clinical evaluation included a detailed family history, a full ophthalmologic exam, assessment of refractive error, and electroretinography. Blood samples were collected and genomic DNA was extracted. Whole genome SNP microarray analysis was performed using either the 250K Affymetrix system or the 6K Illumina system. TRPM1 was screened for mutations by direct sequencing of the coding exons.

Results: Aiming to identify the gene/s causing AR CSNB in the Israeli population, we performed whole genome SNP analysis in 10 patients from 9 families with either AR inheritance pattern or isolated cases from distantly related families. In 7 of the patients we identified a homozygous genomic region on chromosome 15 harboring the TRPM1 gene which was previously described as the cause of CSNB in horses. Screening the gene for mutations in these patients revealed a single homozygous nonsense mutation, c.880A>T (p.Lys294X), in patients from 4 Muslim families (a total of 10 patients) residing in a single village in East Jerusalem. All 10 homozygous patients had CSNB of the Shubert-Bornschein type with high myopia, normal full-field cone ERG, non-recordeable rod ERG, and night blindness. Interestingly, most patients also suffered from reduced visual acuity ranging from 6/12 to 6/120.

Conclusions: Our results show that mutations in the TRPM1 gene cause AR CSNB. During our analysis, three independent laboratories reported similar results, indicating that TRPM1 mutations are a common cause of CSNB. Some of the patients identified in this study had low visual acuity, which is rarely associated with CSNB.

BEYOND PRESSURE MAINTENANCE, NUTRITION SUPPLY AND WAIST PRODUCTS REMOVING, NEW ROLES FOR THE AQUEOUS HUMOR IN THE DRAINAGE SYSTEM

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Introduction: Aqueous humor (AH), known for its role in nutrition supply and waist products removal from the ocular anterior segment, besides taking part in intraocular pressure maintenance, was recently suggested to have paracrine like activities transferring meassages from different parts of the anterior chamber. In our laboratory we were able to show that several members of the Mitogen Activated Protein Kinases (MAPK) are presented in the AH of rats and are subjected to changes depending on the intraocular pressure. We speculate that if active kinases are presented within the AH a balanced activity of phosphatases should be presented. Aim: The aim of the present study was to verify whether phosphatases are presented in the AH of cataract and glaucoma patient undergoing ophthalmic surgery.

Patients / Methods: AH samples were taken from 50 patient suffering from either glaucoma, cataract. Medical backgrounds were recorded. The AH samples were tested for different phosphatases activity and antioxidant capabilities.

Results: Two serine/threonine phosphatases were detected in the AH of cataract and glaucoma patients, PP2A and PP2C. There was no effect of the patient age, sex and medical maladies background such as elevated blood pressure and type two diabetes. The antioxidant status of cataract patient and glaucoma patient was similar.

Conclusions: To our best knowledge this is the first report about the presence of phosphatases within the AH. Further research is needed to identify the phosphatases source and targets.

NOVEL RDH5 MUTATIONS AMONG ISRAELI FUNDUS ALBIPUNCTATUS PATIENTS.

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Introduction: Purpose: To characterize the genetic defects associated with Fundus Albipunctatus patients in Israel.

Patients / Methods: Seventeen patients with Fundus Albipunctatus from seven distinct ethnicities underwent ophthalmic and electroretinogram tests following ISCEV protocol. Genomic DNA was extracted from peripheral blood. Mutation analysis of the 11-cis retinol dehydrogenase [RDH5] gene was performed by direct sequencing of PCR-amplified exons.

Results: Five different RDH5 sequence changes were identified. A previously reported missense mutation c.565 G>A (D128N) was identified in an Arab-Muslim patient. Four novel sequence changes were identified in the Jewish patients. Two mutations; c.343 C>T (R54X) and c.253delTGCC result in the truncation of the 11-cis retinol dehydrogenase protein, in Jews from the Buchara-Persia and Eastern Europe regions, respectively. In two patients we identified the following changes; c.755 G>A (R191Q) and c.1016 G>A (R278Q), both in the heterozygous state.

Conclusions: Mutation analysis of the RDH5 gene in series of Israeli Fundus Albipunctatus patients revealed four novel and one previously reported mutation. These underscore the important role played by this gene in congenital stationary night blindness.

RETINAL TOXICITY OF INTRAVITREAL ENOXAPARIN IN RABBIT AND RAT MODELS

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Introduction: Enoxaparin (Clexan®) is a low-weight molecular heparin that is not associated with bleeding as heparin. It is used in pediatric cataract surgery to decrease postoperative intraocular inflammation. Enoxaparin is composed of small fragments, which attaches to anti-thrombin III and inhibits thrombin formation. Fragments of less than 5,000d may increase disassembly of factor Xa and decrease coagulation and fibrin formation. The purpose of the study was to investigate the potential toxicity of enoxaparin on mammalian retinas.

Patients / Methods: Enoxaparin 10mg/0.1ml was injected into the vitreous of one eye of 8 New Zealand albino rabbits, while NaCl 0.9% 0.1ml was injected into the fellow control eye. Enoxaparin 1mg/0.01ml was injected into the vitreous of one eye of 9 SPD rats and NaCl 0.9% 0.01ml into the fellow control eye. The electroretinogram (ERG) was recorded before, 3 days, 3 weeks and 8 weeks after injection. At 12 weeks, the animals were sacrificed and the histologic sections of the retina stained with Richardson's stain were observed under a light microscope.

Results: There were slightly higher Vmax and lower log σ in the rabbits and rats at 3 weeks and 8 weeks after injection of enoxaparin than after injection of NaCl 0.9%. However, no statistical significant differences were found in Vmax and log σ of b-wave between the study and the control rabbit eyes as well as Vmax and log σ of a- and b-waves between the study and the control rat eyes. The histologic sections of the rabbit and rat retinas showed preservation of all layers.

Conclusions: Enoxaparin had no toxic effect on the rabbit and rat retinas as evident from the ERG responses and histologic sections. These findings support the use of enoxaparin as an agent in vitreoretinal surgery potentially to reduce the postoperative inflammation.

THE EFFECT OF MINOCYCLINE ON MICROGLIAL ACTIVATION IN EXPERIMENTAL GLAUCOMA MODEL IN RATS

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Introduction: Microglia becomes activated in the process of retinal ganglion cell axon degeneration within the optic nerve that occurs in glaucoma. The purpose of this study was to evaluate the effect of systemic minocycline hydrochloride on the activation of microglial cells in glaucomatous rat eyes.

Methods: Elevated intraocular pressure was induced in the left eyes of 12 rats by translimbal laser photocoagulation treatment.
Six rats were treated by daily intraperitoneal injections of minocycline at a dosage of 22 mg/kg per day for 30 consecutive days. The control group, comprised of the other 6 rats was treated by daily intraperitoneal injections of saline. The effect of the treatment was evaluated by quantification of activated microglia using immunohistochemistry.

Results: There was a statistically significant increase in the intraocular pressure in the eyes which underwent translimbal laser treatment compared to the control group. The overall activated microglia area in the eyes which underwent translimbal laser photocoagulation was significantly larger than in the eyes which were not. There was no statistically significant difference in the microglial activation between the eyes of the minocycline treated rats compared with the eyes of the control group.

Conclusions: Microglia cells are activated in the retina of glaucomatous eyes in the glaucoma model in rats. However, no effect of systemic treatment with minocycline hydrochloride 22 mg/kg per day for 30 days was demonstrated on the glaucomatous microglial cells activation.

CRITICAL ROLE OF THE NBS1 PROTEIN IN THE DEVELOPMENT AND FUNCTION OF THE MOUSE VISUAL SYSTEM

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Introduction: Nijmegen Breakage Syndrome (NBS) is a rare autosomal recessive disorder characterized by microcephaly, mental deficiency, “bird-shaped” face, immunodeficiency, predisposition to lymphoreticular malignancies, chromosomal instability, and radiation sensitivity. NBS is caused by hypomorphic mutations in the NBS1 gene, which encodes the Nbs1 (nibrin) protein. Nbs1, together with the Mre11 and Rad50 proteins, constitute the NRM complex, a sensor of double strand breaks (DSBs) in the DNA. Knocking out the murine homolog of NBS (Nbn) led to embryonic lethality. When Nbs was conditionally inactivated in the central nervous system (CNS) by the nestin-Cre conditional gene targeting system, the animals (Nbs1-CNS-del) showed microcephaly, cerebellar mal-development and ataxia. These abnormalities are reminiscent of the clinical presentation of NBS and of advanced ataxia telangiectasia (A-T). Thus, Nbs1-CNS-del mice represent a chromosomal instability disorder that resembles both these diseases. The objective of our work was to investigate the possible role of the Nbs1 protein in the development, organization and function of the visual system.

Patients / Methods: Mice in which the NBS1 gene was specifically disrupted in the CNS were subjected to various imaging analyses including MRI. Retinas and optic nerves which were isolated from these mice were subjected to immunohistochemical and biochemical analyses. Electroretinogram was used to study the retinal response to light.

Results: Here we report that conditional targeted disruption of the murine NBS1 gene in the CNS resulted in mal-development, disorganization and dysfunction of the murine visual system. Nbs1 deletion resulted in reduced diameters of Nbs1-CNS-del eyes and optic nerve. MRI analysis revealed defective white matter development. Nbs1 inactivation altered the morphology and organization of the glial cells. Interestingly, the levels of the axonal guidance molecule semaphorin-3A and its receptor neuropilin-1 were up-regulated in the retina of the mutant mice. Electroretinogram analysis revealed marked reduction in a and b waves, indicative of severe dysfunction of the photoreceptors.

Conclusions: Our study points to a novel function of Nbs1 in the development, organization and function of the visual system.

IMMUNE BASED TREATMENTS ENHANCED OPTIC NERVE AXONAL REGENERATION AND GROWTH FOLLOWING CONTROLLED INJURY

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Introduction: Neural cells of adult mammalian CNS are not capable of spontaneous regeneration. The failure to regenerate following axonal injury is related among other things to its immunosuppressive nature, which restricts the ability of both recruited blood-borne monocytes and CNS-resident microglia to support a process of clearance and repair. In contrast, the PNS has the ability to regenerate due to a more permissive environment for axonal regeneration that includes myelin clearance by macrophages. The presence of myelin-associated axon-growth inhibitory molecules, including Nogo-A, myelin associated glycoprotein (MAG), and oligodendrocyte- myelin glycoprotein (OMgp), along the projection pathway of growing axons contribute to their failure to cross the lesion site. We believe that in order to enhance the potential of axonal regeneration in the CNS It is necessary to induce a more permissive environment. In order to achieve that goal we focused on macrophage based treatments combined with sciatic nerve conditioned media using an optic nerve axotomy model.

Methods: A rat model of complete transection of the optic nerve that spares the vascular supply and the neural scaffold was used. The treatments included Injection of macrophages, minced sciatic nerve or the combination of the two previous elements. The substances were administered immediately following the optic nerve transection, directly at the site of injury. The response of the optic nerve to the treatments following the injury was studied by immunohistochemistry approach using MBP, GAP43 antibodies and WGA staining.

Results: Injection of sciatic nerve extract into the optic nerve led to the clearance of myelin and axonal growth through the lesion site compared with the control injured optic nerve injected with DMEM. The organization of the treated nerve was better compared to non treated injured axon. In addition, this treatment enhanced axonal growth, which crossed the lesion site.

Conclusions: Immune treatment following controlled injury of optic nerve has a positive effect in generating new conditions which are more permissive for axonal regrowth. Further research has to be done in order to define the optimal treatment.

THE EFFECT OF THE APOE GENOTYPE ON RETINAL NEOVASCULARIZATION IN AN APOLIPOPROTEIN E TRANSGENIC MICE MODEL OF OXYGEN-INDUCED RETINOPATHY

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Introduction: Apolipoprotein E (ApoE) is polymorphic gene with three major isoforms, E2, E3 and E4. The allele E4 is the most prevalent risk factor for Alzheimer's disease. ApoE4 is also a detrimental factor in stroke and vascular diseases. Paradoxically, in the eye apoE4 seems to have a protective effect. Our aim was to investigate the possibility that angiogenesis in the retina is affected isoform specifically by apoE isoforms.

Patients / Methods: Angiogenesis was induced by the model of retinopathy of prematurity (ROP). Targeted replacement mice, in which the endogenous mouse apoE was replaced by human apoE3 and apoE4 were used. 1-week-old (postnatal day 7: P7), mice were placed, (together with their nursing mothers) in an hyperoxic environment for five days after which they were returned to normal conditions. Control mice were grown in normoxic conditions. Mice were sacrificed at days P17 and P21 (i.e. five and nine days after the hyperoxia) and their eyes were enucleated. Quantification of the number of new blood vessels was performed on Hematoxylin & Eosin (H&E) stained paraffin-embedded ocular cross- sections, whereas quantification of gene expression to evaluate angiogenic activity in isolated retinas was performed utilizing real time PCR Array for mouse angiogenesis

Results: Histological assessment of the retinas of the oxygen-treated transgenic mice revealed a marked increase in the levels of newly formed retinal blood vessels of the apoE4 and apoE3 mice as compared to control normoxic mice. Furthermore, the extent of neovascularization was more pronounced in the hyperoxic apoE4 mice as compared to the corresponding apoE3 mice. The mechanism underlying this effect was investigated by gene expression analysis. Under normoxia, the expression of angiogenic markers such as VEGF and TGFß ligands and receptors were lower in the retinas of the apoE4 mice in comparison to the corresponding apoE3 mice. Furthermore, following hyperoxia the expression of the VEGF and TGFß systems increase much more in the apoE4 than the apoE3 mice.

Conclusions: These results show that oxygen induced neovascularization in the retina is affected isoform specifically by apoE4 and suggest that these effects are mediated via the VEGF and TGFß systems.

ELUCIDATING THE TRANSCRIPTIONAL TARGETS OF PAX6 IN MAMMALIAN RETINOGENESIS

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Introduction: The Pax6 transcription factor is essential and sufficient for eye formation in vertebrate and invertebrate species. Previously, we have conducted somatic inactivation of Pax6 in the retinal progenitor cells (RPCs), prior to onset of their differentiation which resulted in their exclusive differentiation to amacrine interneurons, while other cell types failed to form (Pax6flox/flox;a-Cre). This demonstrated that Pax6 is fundamental for the multipotency of RPCs. The aim of the current study is to reveal the genes that are directly regulated by Pax6 in the RPCs and thus mediate its role during retinal neurogenesis.

Patients / Methods: RNA was isolated from Pax6-deficient and control RPCs and was subjected to comparison of gene-expression profiles using the Affymetrix Mouse 430.2 Gene expression arrays, to identify the transcriptional network dependent on Pax6. A chromatin immunoprecipitation (ChIP) using Pax6-specific antibodies was performed on embryonic eyes (E13.5) and the precipitated DNA was hybridized to Affymetrix Mouse Promoter Array 1.0R, to determine direct transcriptional targets of Pax6. The expression pattern of selected targets was validated in normal and Pax6-retinal mutants by in situ hybridization or immunohistochemistry. Following this initial validation, their regulation by Pax6 was investigated using Electromobility Shift Assay (EMSA) in vitro and Luciferase assay in cell culture.

Results: The intersection of the two lists obtained from the high-throughput experiments produced 215 genes, which are putative direct transcriptional targets of Pax6 in the developing retina. Of these, two factors implicated in mediating the differentiation of ganglion cells were selected: Brn3b and Fgf15. Both genes are down stream targets of the bHLH transcription factor Math5, which is essential for formation of all ganglion cells and its expression is also dependent on Pax6. Pax6 was found to bind the promoters of both Brn3b and Fgf15 in vitro by EMSA. Preliminary results using reporter assay in cell culture suggest that Pax6 functions to activate these regulatory sequences.

Conclusions: The results reveal multiple targets for Pax6 in the ganglion cell lineage and the mode of their regulation by Pax6. The findings expose the gene network regulated by Pax6 in the course of the differentiation of ganglion cells in mammals.

DUAL REQUIREMENT FOR PAX6 IN RETINAL PROGENITOR CELLS

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Introduction: The adult mammalian retina contains seven distinct cell types. These cells differentiate in a spatially and temporally ordered pattern from a pool of multipotent retinal progenitor cells (RPCs). Although able to produce all retinal cell types, RPCs differentiate only into a limited number of cellular types at any given time. To understand the processes underlying cell fate choices in the retina it is vital to understand the intrinsic heterogeneity of retinal progenitor cells. Pax6 is a highly conserved transcription factor found to play a key role in RPCs differentiation. In complete Pax6 absence eyes fail to develop leaving only a rudimentary optic cup (OC), while a conditional knockout of Pax6 in the retina restricted RPCs to an amacrine exclusive fate.

Patients / Methods: Here we investigated the dynamics of cell type specification in three Pax6 mutant models; The Pax6 systemic knockout mice in which a Beta-Galactosidase cassette was inserted into the Pax6 locus (Pax6lacZ/lacZ), and two conditional knockout models in which exons 4-6 of the Pax6 gene are flanked by loxP sequences and the Cre is expressed exclusively in RPCs.

Results: Surprisingly in both the systemic and conditional Pax6 mutants we identified two distinct RPCs populations differing in expression of various specification markers. Using the conditional models we further exposed the location of each population. The first population is located at the most distal domain of the OC. This population of RPCs does not proliferate following Pax6 loss, the cells do not differentiate into mature neurons and are eventually lost from the adult retina. Cells belonging to the second population are located more centrally in the OC, these cells show only a modest reduction in proliferation and differentiate into mature amacrine interneurons following the normal time course of amacrine cell genesis.

Conclusions: Our results suggest that these two populations are formed early in development and in a Pax6 independent mechanism. Furthermore, given the exclusive phenotype of each population we propose dual role for Pax6 in mammalian retinogenesis.

ZINC-DESFERRIOXAMINE COMPLEX ATTENUATES RETINAL DEGENERATION IN RD10 MICE BY REDUCING IRON-INDUCED OXIDATIVE INJURY

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Introduction: Recent studies suggest that iron-associated oxidative injury plays a role in the pathogenesis of blinding retinal diseases including age related macular degeneration and retinitis pigmentosa. The metal-chelating complex Zinc-Desferrioxamine (Zn/DFO) has good cellular permeability and can modulate availability of intracellular labile iron, thus reducing formation of reactive oxygen species. The purpose of the present study was to evaluate whether Zn/DFO can affect the course of retinal degeneration in the rd10 mouse model of retinitis pigmentosa.
Patients / Methods: Starting from post-natal day 3/4, rd10 mice were treated with intraperitoneal injections of Zn/DFO (2.5mg/kg) three times/week. Control animals were similarly injected with saline. At 4.5 weeks of age, extent of retinal oxidative injury as well as photoreceptor function and survival were assessed using biochemical, electrophysiological, and quantitative immuno-histochemical techniques.
Results: Intraperitoneal injections of Zn/DFO lead to significant decrease of retinal ferritin content (0.11 nmol/mg total protein) as compared with saline controls (0.16 nmol/mg total protein, $p<0.0001$). Average iron content within ferritin molecules was also significantly reduced in Zn/DFO-treated mice (827 atoms/molecule) in comparison with saline-treated retinas (1168 atoms/molecule, $p<0.005$). We found that levels of TBARS, a marker of lipid peroxidation, were significantly lower in Zn/DFO-injected mice (2022±128nmol/mg protein) as compared with saline-treated controls (2538±171nmol/mg protein, $p<0.05$), indicating less oxidative injury. Levels of superoxide-dismutase and catalase mRNAs were significantly lower in Zn/DFO-treated retinas in comparison with controls whereas levels of glutathione peroxidase mRNA were similar in both groups. Zn/DFO-treated mice demonstrated better preserved rod and cone function as well as enhanced photoreceptor survival.
Conclusions: Treatment with intraperitoneal injections of Zn/DFO provides functional and structural rescue in rd10 mice. The results suggest that the protective effects of Zn/DFO are mediated through restriction of labile iron bioavailability, attenuation of oxidative injury and modulation of mRNA levels of antioxidant enzymes.

VEGF - IS IT A NEW MARKER FOR METASTATIC UVEAL MELANOMA?

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Purpose: VEGF has been shown both in various in vitro and in vivo models to be mitogenic, chemotactic and instrumental in angiogenic processes. High levels of serum VEGF have been reported in many types of Cancer patients, especially in their metastatic stages. The aim of this study was to examine the potential of VEGF serum levels to provide significance as a Tumor Marker in Uveal Melanoma (UM) patients: to assess differences in VEGF levels between patients after initial treatment, and in their pre metastatic disease free (DF) clinical status, as compared to their metastatic stage and identify earlier liver metastases.
Methods: Levels of serum VEGF were analyzed by ELISA for 23 UM patients at the time of diagnosis, close after treatment and 3 years later, and compared with serum VEGF levels of 39 metastatic patients, 58 10-year disease-free (10yDF) patients, and 23 normal controls. None of the 23 study patients developed metastases within 5 years from diagnosis. VEGF ratios were calculated per patient between after treatment and diagnosis, and between diagnosis and 3 years later. Matched pairs univariate analysis was performed for 21 metastatic patients for whom sera were available from before and after the diagnosis of metastases. Patients were followed biannually with liver ultrasonography and blood test for the presence of metastases.
Results: The mean (SE) VEGF level ratio from after treatment to diagnosis was 1.08 (0.07) (p= 0.4050), and the 3-years after diagnosis to diagnosis VEGF level ratio was 1.53 (0.11) (p=0.0014). The inter-patient range was large and can be appreciated from the mean (SD) levels for the control, 10yDF, and metastatic groups (329.65 (190.0), 407.66 (261.9) and 453.52 (270.2), respectively, p=0.2456). The mean (SE) post/pre-metastatic levels ratio was 1.35 (0.21) (p=0.0365).
Conclusions: Serum VEGF levels increased significantly after the development of metastases. However, the wide inter-patient variance makes it difficult to determine the metastatic status of an individual patient based on a single VEGF serum level. An increase in VEGF on serial measurements may indicate the development of metastases. The 35% increase in VEGF after development of metastases raises suspicion that the 53% increase 3 years from diagnosis indicated the existence of micrometastases in some of the patients that for unknown reasons did not develop to a full-blown metastatic disease. Further investigation is warranted to assess VEGF’s value as a predictive marker for metastatic disease.

USING ZEBRAFISH TO UNDERSTAND NORMAL AND ABNORMAL EYE DEVELOPMENT

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Introduction: We use the zebrafish model organism to study molecular genetic mechanisms that underlie early eye development. Zebrafish is an excellent vertebrate model system in which one can address questions regarding organogenesis, being amenable to genetic, embryological and chemical manipulations, as well as live embryo imaging.

Results: (1) In zebrafish, as in humans, loss of function of the holoprosencephaly-related transcription factor Six3 causes anophthalmia or microphthalmia. However, eye progenitors are specified in these Six3-deficient embryos. We will use a transgenic approach to follow eye progenitors in live Six3-deficient embryos and establish their fates. We will also isolate eye progenitors from normal and Six3-deficient embryos and perform microarray analyses to identify the molecular mechanisms that function downstream of Six3 in early eye development. (2) We study a mutant in which eye malformations, including coloboma are evident. Interestingly, the mutated gene is required for vascular development, hence linking vascular development and eye morphogenesis. We are currently characterizing the defects in eye development observed in this mutant and investigating how vasculature abnormalities cause eye malformations. (3) We study the *vu122* mutant, in which the lens appears to be extruded and to detach from the eye. We will characterize the phenotype and clone the mutated gene.

Conclusion: Through the described studies we will acquire knowledge that could contribute to genetic counseling, predicting and possibly preventing congenital eye malformations.

Session IV - Cataract

SAFETY AND STABILITY OF AN INJECTABLE MODEL OF INTRAOCULAR TELESCOPE IN COMPARISON TO THE CURRENT INTRAOCULAR TELESCOPE MODEL

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Introduction: PURPOSE: To compare the surgical procedure, safety and stability of the two Implantable Telescope models in a rabbit eye model. • DESIGN: An experimental animal study.

Patients / Methods: Current model of the implantable telescope was randomly implanted in one eye and the other injectable model in the fellow eye of eight New Zealand White rabbits. The rabbits were followed up to one month after the surgery including biomicroscopy, lens position, stability and endothelial cell count (ECC). The eyes were enucleated at the end of the follow up period, fixated in formalin and examined by high-frequency ultrasound.

Results: All the telescopes were implanted successfully within the capsular bags. The injectable model was implanted through a significantly smaller incision than the current model. Operative time was shorter, endothelial cell loss was lower and anterior chambers were deeper in the injectable model group as compared to the current telescope group.

Conclusions: The new injectable model exhibit significant improvement in clinical parameters and safety profile of the implantable telescope.

PROTECTION OF THE EYE LENS AGAINST INJURY INDUCED BY SIMULATED DIABETIC STATE: USE OF DESFERRIOXAMINE COMPLEXES AND N-ACETYL-L-CYSTEINE

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Introduction: There are several theories regarding possible mechanisms leading to diabetic cataract. Few of them include oxidation stress. Aims: Investigation of the mechanisms of cataract formation under diabetic conditions, and examination of the effects of N-acetyl-L-cysteine (NAC), (which is a precursor of glutathione and an anti-inflammatory agent) and derivatives of Desferrioxamine (DFO)(which is an iron chelator and reduces oxidative stress) on diabetic cataract.

Patients / Methods: The experiments included 78 bovine lenses. The lenses were divided into eight different treatments including controls and lenses incubated with high glucose levels (450 mg %) with or without each one of the antioxidants. The intact lenses were incubated for a period of two weeks in our special organ culture conditions. Lens optical quality was analyzed every 24 hours. At the end of the culture period, oxidation was followed in the lens epithelial cells with dichlorofluorescein assay and lens proteins were analyzed by 2D gel electrophoresis.

Results: High levels of glucose in the culture medium caused optical damage to bovine lenses, increased lens volume due to swelling, increased oxidation of lens epithelial cells, and caused changes in lens proteins mainly gamma crystalline. The anti-oxidants reduced this damage. NAC and Zn-DFO protected the lenses better than DFO.

Conclusions: Antioxidants can protect the lens from high glucose damage. This study was supported in part by a grant from the Esther and Chaim Coppel Trust – ministry of health and by the Guzik Ophthalmology Research Fund

PROSTHETIC IRIS IMPLANTATION FOR TRAUMATIC IRIS DEFICIENCY

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Introduction: Patients that lack adequate iris tissue can suffer from disabling glare and photophobia, decreased depth of focus and increased higher order aberrations. Moreover, implantation of a standard intraocular lens (IOL) after cataract surgery without addressing the iris deficiency may result in further aberrations induced by light rays passing at the margin and around the IOL. Purpose: to report the outcomes of prosthetic iris lens implantation (Ophtec or Morcher IOLs) for the correction of traumatic iris deficiency.

Patients / Methods: In a retrospective study the medical records of 13 consecutive patients that underwent Ophtec or Morcher IOL implantation were reviewed. Preoperative data collected included demographics, etiology for iris deficiency, previous surgeries, preoperative eye pathology and visual acuity. Operative data and postoperative outcomes were recorded including visual acuity, subjective perception of change in glare and photophobia and postoperative complications.

Results: 11/13 patients underwent simultaneous penetrating keratoplasty. Best corrected log MAR visual acuity (BCVA) improved from 2.25±0.76 before surgery to 1.52±1.16 following surgery. (P = 0.0086) Five of 11 patients (45.5%) reported an improvement in glare sensation, whereas 6 (54.5%) reported no change in glare. Postoperative complications included 2 graft rejection episodes 1 year following surgery, 2 cases of increased postoperative inflammation, one of which required removal of the Morcher IOL and 3 patients developed a new onset glaucoma following surgery. At the last follow up visit the implanted Morcher/ Ophtec IOL showed excellent centration and positioning in all cases. No eye developed dislocation of the IOL, macular edema or retinal detachment.

Conclusions: implantation of Morcher or Ophtec IOLs in traumatic aniridia improved visual acuity significantly in most of the patients and reduced photophobia and glare symptoms in a considerable number of them. Glaucoma remains a main postoperative issue.

CATARACT EXTRACTION IN EYES WITH UVEITIS: VISUAL OUTCOME AND COMPLICATIONS

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Introduction: Cataract is a common complication of eyes with uveitis, which in turn considered a challenge to cataract surgeons. This study investigates the outcome of cataract extraction in patients with uveitis.
Patients / Methods: Retrospective review of the medical records of adult patients with uveitis, who underwent cataract extraction between the years 1991-2008. Visual acuity and intraocular inflammation data were collected for preoperative and postoperative visits, as well as surgical data and complication rate. Patients with less then 3 months follow-up or diagnosis of intraocular lymphoma were excluded.
Results: 89 adult patients (114 eyes) were found. Mean age was 48.58±18.06. 49.1% of the eyes had the diagnosis of panuveitis, 42.1% anterior uveitis, 6.2% posterior uveitis and 2.6% intermediate uveitis. 84 eyes (76.4%) received perioperative anti inflammatory prophylaxis. 53.5% of eyes underwent phacoemulsification, 31.6% ECCE, 14% lens aspiration and 0.9% ICCE. IOL implantation was preformed in 112 eyes (98.2%). IOL type: Hydrophobic acrylic (36.4%), hydrophilic acrylic (30%), PMMA (26.4%) and heparin coated PMMA (6.4%). Mean follow-up time was 41.46 months. The mean BCVA at first postoperative day and at the last follow-up visit improved by 0.5 and 0.59 log MAR compared to preoperative BCVA respectively (p=0.00). BCVA improved by 2 or more lines in 92 eyes (80.7%) at the last follow-up visit. The rate of eyes with BCVA≤0.3 increased from 8.8% preoperatively to 35.2% at first postoperative day and to 53.1% at the last follow-up visit. The rate of eyes with medium and severe degree of intraocular inflammation has increased from 2.6% preoperatively to 64.8% at the first postoperative day then dropped to 16.7% at 1 month postoperatively, 12.6% at 3 months and 8.9% at the last follow-up visit. CME occurred in 24 eyes (22%), PCO occurred in 69 eyes (63%) and YAG laser capsulotomy was preformed in 37 eyes (32.5%), ERM occurred in 33 eyes (28.9%).
Conclusions: Eyes with uveitis achieve significant improvement visual acuity following cataract extraction, that remains stable over a long follow-up. Postoperative intraocular inflammation increases at the first month after surgery and then subsides. The high rate of postoperative complications in uveitic eyes renders special attention preoperatively at surgery and postoperatively.

CORNEAL WOUND TEMPERATURE ELEVATION DURING MICROINCISION CATARACT SURGERY: SLEEVELESS VS COAXIAL TECHNIQUES

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Introduction: Purpose: To measure temperature rise at the corneal wound during conventional 3.0 mm phacoemulsification as compared to 3 micro-incision cataract surgery (MICS) techniques: micro-coaxial (C-MICS), bimanual (B-MICS) and 3 port (Tri-MICS).

Patients / Methods: Temperature was recorded by inserting a thermocouple adjacent to the corneal incision in post mortem porcine eyes while using continuous phaco power of 70% for 1 minute (Alcon Infinity®). Bottle height and aspiration rate were kept constant. Experiments were done using a coaxial sleeved 19G tip through a 3.0 mm incision (conventional), micro-coaxial 20G tip through 2.2 mm (C-MICS), sleeveless 20G tip through a 0.9 mm incision with an irrigating chopper through 1.1 mm (B-MICS) and a sleeveless 20G tip through a 0.9 mm incision and a specialized 19G anterior chamber maintainer (ACM) through 1.1 mm (Tri-MICS).

Results: All four groups maintained a clear cornea with no signs of corneal burns. The sleeveless Tri-Mics system had the lowest temperature profile with a maximal temperature rise of 1.2°c. The highest temperature profile was measured with the sleeved 19G conventional technique with a maximal temperature rise of 12.1°c.

Conclusions: Sleeveless phaco surgery (B-MICS and Tri-MICS) results in minimal corneal incision temperature rise as compared to co-axial techniques. This is probably due to the cooling effect of the fluid constant leak through the incision.

OCT-GUIDED FEMTOSECOND LASER SYSTEM FOR CATARACT SURGERY

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Introduction: Currently cataract surgery is a manual procedure and its outcomes are highly dependent on the surgical skills and complicating factors. To increase its precision and reproducibility we developed an Optical Coherence Tomography-guided femtosecond laser system for cataract surgery.

Methods: A long range spectral domain OCT system automatically discerned the anterior and posterior surfaces of the lens and cornea for planning of capsulotomy, lens segmentation and corneal incisions. Cutting parameters of the scanning femtosecond laser (1.03um, <700fs, 10-100kHz, 1-10uJ) for all procedures were first established on cadaveric eyes and lenses. Retinal safety was then verified using Dutch Belted rabbits. 20 patients have been treated, and the cut quality was evaluated by optical microscopy, histology and scanning electron microscopy (SEM).

Results: The treated eye is immobilized by suction ring without amaurosis. The OCT is able to identify the surfaces of the cornea and lens within 25 □m, and the treatment planning software accurately places the femtosecond laser patterns within those structures. Perfectly round (aspect ratio > 0.98) and highly precise (less then 0.1mm variation in diameter) capsulotomies are achieved. SEM of laser incised capsules show smooth, clean edges. Lens conditioning patterns facilitate its easy splitting into quadrants and nucleus softening. Even dense cataracts were removed with minimal use of phaco power. The OCT guided laser maintains a well defined safety distance to the posterior lens capsule to ensure its integrity. Multi-planar corneal incisions can provide for unique self-sealing wound constructions. No retinal damage was found in Dutch Belted rabbits at 8 times the retinal exposure used for clinical settings.

Conclusions: OCT-guided femtosecond laser cataract surgery greatly improves precision and reproducibility. The laser produces sharp-edged continuous capsular cuts, while lens preconditioning simplifies phacoemulsification, especially with dense cataracts. This integrated system offers a previously unattainable level of exactitude that promises improved centration of the intraocular lenses, and correction of residual corneal astigmatism.

Session V – Genetics 1

MUTATIONS OF A NOVEL GENE, C2ORF71, CAUSE AUTOSOMAL RECESSIVE RETINITIS PIGMENTOSA

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Introduction: Retinitis Pigmentosa (RP) is the most common form of hereditary retinal degeneration with a worldwide prevalence of 1 in 4,000. Over 30 genes and loci have been implicated in non-syndromic autosomal recessive (arRP). Our purpose was to identify the cause for arRP in consanguineous families from Israel and the Netherlands.

Patients / Methods: Whole-genome homozygosity mapping was conducted in two consanguineous families segregating arRP. Haplotype analysis with microsatellite repeat markers linked to the identified locus was conducted in additional families. Candidate genes located within this locus were screened for mutations by direct sequencing. Patients who were homozygous for the identified mutations underwent ophthalmic evaluation, including funduscopy and electroretinography (ERG).

Results: A shared homozygous region on chromosome 2p23.3-22.3 was identified in two families. This interval of 4.8 Mb defined a new RP locus. A missense mutation in one of the genes residing in this interval, C2ORF71, has been previously reported to be associated with RP. This novel gene harbors two exons and encodes a putative protein of 1288 amino acids. Mutation analysis detected a nonsense mutation (c.556C>T; p.Q186X) segregating with RP in one Israeli family, and a 1bp deletion (c.946delA; p.N316MfsX5) in a Dutch family. Haplotype analysis revealed co-segregation of a C2ORF71-linked haplotype with arRP in a second Israeli family. In this family a 13bp deletion (c.2756_2768del; p.K919TfsX) was identified. Mutations in C2ORF71 are associated with a typical RP phenotype including symptoms of poor night vision and peripheral field loss, a fundus examination showing a typical retinal bone spicule-type pigment deposits and pale appearance of the optic disk and markedly reduced or completely extinct ERGs

Conclusions: Truncating mutations of C2ORF71 were identified in three unrelated families, therefore confirming the involvement of this novel gene in the etiology of arRP.

VARIOUS PHENOTYPES RANGING FROM OCAI TO NORMAL PIGMENTATION CAUSED BY COMPOUND HETEROZYGOSITY FOR THE TYROSINASE GENE VARIANT R402Q

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Introduction: Mutations in the tyrosinase gene (TYR) cause oculocutaneous albinism type-1 (OCAI) and autosomal recessive ocular albinism (AROA). Most AROA albinos are compound heterozygotes (CH) for various “severe” TYR mutations, and the common polymorphism R402Q, which causes thermolabile tyrosinase activity. However, several normally pigmented parents of severely affected OCAIA albinos were also CH for various “severe” TYR mutations and R402Q. Our purpose was to determine whether R402Q is a pathogenic mutation or common polymorphism.

Patients / Methods: Phenotypic evaluation included description of hair, eye and skin color, presence of nevi and ability to tan. Ocular findings specifically looked for visual acuity, presence of nystagmus, iris transillumination, visibility of choroidal vessels and hypoplasia of the macula. Blood DNA was PCR amplified followed by restriction digest or sequencing.

Results: We screened Israeli Jewish albinos and their first degree relatives for the R402Q variant and “severe” TYR mutations, and identified 23 albinos and 50 self declared normally pigmented relatives who are CH for a severe TYR mutation, and R402Q. Three of these albinos were previously determined as OCAI by histological examination. The entire TYR gene was sequenced in the CH albinos, and no additional mutation was identified. Two TYR mutations – M1V and E294K are always in cis (same allele) with R402Q. Next, we evaluated the phenotype of 20 CH albinos, 16 of the normally pigmented CH relatives and their family members. Moderate to mild phenotypes of OCAIB, OCAII and OA, with marked intra-familial variability, were detected in the CH albinos. Some “albinotic” characteristics were observed in all tested “normal” siblings of CH albinos who share the same genotype. This usually includes hypopigmention compared to other family members, and/or in few cases very mild albinotic symptoms upon eye examination. CH parents of OCAIA albinos had normal vision and only few were hypopigmented.

Conclusions: In most cases CH for severe TYR mutations and R402Q will have normal vision and pigmentation. However, families with a CH albino child are at risk for additional albino (OCA or OA) or hypopigmented sibling with the same genotype. The familial clustering and inter and intra-familial variability indicate the existence of a modifier of severity.

ADAM9 - THE MOST RECENT GENE CAUSING AUTOSOMAL RECESSIVE CONE-ROD DYSTROPHY

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Introduction: Cone-rod dystrophy (CRD) is a group of genetically and phenotypically heterogeneous retinal disorders. CRD is characterized by loss of cone and rod photoreceptors, reduced visual acuity (VA), color-vision abnormalities, photophobia, and visual-field loss. So far, mutations in only three genes (ABCA4, CERKL, and RPGRIP1) have been shown to cause autosomal recessive (AR) CRD, with two other previously published loci on chromosomes 1 and 8.

Patients and Methods: Clinical evaluation of patients included detailed family history, ophthalmologic exam, and full-field electroretinography (ff-ERG). Blood samples were collected from the patients and genomic DNA was extracted. Affymetrix whole-genome 10K and 250K SNP arrays were used to genotype markers. Mutation analysis was performed by direct sequencing of PCR products.

Results:
Homozygosity mapping in 2 consanguineous families (of Tunisian Jewish {MOL0172} and Arab Muslim {MOL0277} origins) affected with CRD indicated linkage CORD9. Patients from the two families were screened for mutations in three candidate genes. Screening of the ADAM9 (a disintegrin and metalloproteinase domain 9) gene revealed mutations in both families. All six affected individuals suffered from poor VA and macular changes. Patients had discrete white patches in the posterior pole and around the optic disc with a pigmentary retinopathy. Both rod and cone functions were decreased by ffERG with subnormal EOG. In both families we identified a null mutation that introduces a premature stop codon. The Muslim patients were homozygous for the c.411-8A>G mutation (a splicing mutation introducing 7 extra bases to exon 6) and the Jewish patient were homozygous for the c.490C>T (p.R164X) mutation.

Conclusions:
ADAM9 mutations cause a distinct type of CRD. The patients suffer from the typical CRD phenotype with a unique funduscopic appearance. The discovery of this gene solves the puzzle of CORD9 and opens a door for further research. ADAM9 is a member of a family of proteins that are membrane-anchored, structurally related to snake venom disintegrins, and have been implicated in a variety of biological processes involving cell-cell and cell-matrix interactions, including fertilization, muscle development, and neurogenesis. Its role in the retina is yet to be discovered but it may be involved in ECM remodeling or may act as an adhesion molecule.

ROLE FOR PAX6 IN THE MELANOGENESIS OF THE RETINAL PIGMENTED EPITHELIUM IN MICE

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Introduction: The ocular pigmented epithelium (PE) cells share their embryonic origin with the neuroretina and give rise to the retinal pigmented epithelium (RPE) and components of the iris and ciliary body. Defects in PE tissue types dramatically hamper ocular physiology and are associated with diseases leading to blindness in humans. Pax6 is dynamically expressed in the PE progenitors and is detected in a subtype of PE cells in the adult eye. It was previously demonstrated that Pax6, together with Pax2, are required for an early step in the specification of PE cell types. However Pax6's role after the specification was not resolved.

Patients / Methods: discover the roles of Pax6 in the differentiation of the prospective PE to RPE cells we performed conditional elimination of Pax6 using the Dct-Cre transgene, in which Cre is expressed in the developing pigmented epithelium after its specification.

Results: This inactivation resulted in microphthalmia, lack of anterior ocular structure, and surprisingly a dramatic reduction in the pigmentation of the RPE without altered specification. Molecular analysis revealed a reduction in the expression of key genes participating in the melanin synthesis pathway including D-Mitf, the RPE specific Mitf isoform, Tyrosinase and tyrosinase related protein 1 (Tyrp1). Analysis of D-Mitf knock out mice suggests that reduced RPE pigmentation in Pax6 mutants cannot solely be attributed to lower Mitf expression.

Conclusions: In summary, this study reveals, for the first time, the role of Pax6 in ocular melanogenesis possibly by direct regulation of key melanogenic genes during early stages of RPE differentiation.

Session VI – Cornea 1

MEASURING CORNEAL CROSS-LINKING BY TERAHERTZ RADIATION

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Introduction: Corneal cross-linking is an emerging treatment modality used for corneal reinforcement in cases of keratoconus or other ecstatic corneal disorder. Currently, there is no non-destructive method to control or measure treatment effect on corneal tissue. The aim of this study was to measure the effect of corneal cross linking on terahertz transmittance in order to evaluate the feasibility of this method for clinical control of crosslinking effect

Patients / Methods: Porcine corneas were treated within 8 hours of enucleation with 0.1% riboflavin in 20% dextran solution and radiated by UV light (365nm) 3.0mW/cm2 for 30 minutes. Control group were treated by the riboflavin without UV radiation. Transmittance tests were performed with a terahertz time domain spectrometer (TR-2000, Picometrix). The terahertz spectrum covered 0.05 to 2 terahertz range. The samples were positioned at a focus of a 10 cm focal length Teflon lens. The transmission was first measured through a circular pinhole as a reference. Then, after mounting the corneas in front of the pinhole, the transmission of each cornea was measured. The terahertz amplitude transmitted through an empty pinhole was 0.55 V. Following the first transmittance test, corneas were dehydrated at a controlled temperature and humidity room (20.60C, 63.3% humidity) and were re-examined at times 90, 180, 1440 minutes

Results: Transmitted peak amplitude were significantly higher for the treated corneas as compared to control cornea at time 0 [0.029 Vs. 0.013, $P<0.001$], 90 [0.064 Vs. 0.029, $P<0.001$], 180 [0.147 Vs. 0.082, $P=0.02$]. There was a small non-statistically significant difference for the totally de-hydrated corneas [0.414 Vs. 0.832, $P=0.07$]

Conclusions: Corneal cross linking induced higher terahertz transmittance. The effect was more pronounced in hydrated corneas as compared to dehydrated corneas. The mechanism of this effect might be related to reduced water content in treated corneas as compared to control group or to other effects of cross linking on corneal lamellas

EVALUATION OF INTRA-OCULAR PRESSURE ACCORDING TO CORNEAL THICKNESS BEFORE AND AFTER EXCIMER LASER CORNEAL ABLATION FOR MYOPIA

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Purpose: Intraocular pressure is known to be affected by corneal biomechanics, thickness and curvature. Laser In Situ Keratomileusis (LASIK) and Photorefractive Keratectomy (PRK) have gained popularity in recent years for correcting myopia. Following these procedures, structural corneal changes occur: corneal thinning, alterations in corneal curvature and development of irregular astigmatism. These may lead to lowering of actual IOP and may delay the diagnosis of future glaucoma. In this study we aimed to determine the relation between the mean central corneal thickness and the change in intraocular pressure measurements following various corneal ablation techniques, using different measurement methods.

Methods: 200 myopic eyes undergoing LASIK or PRK were enrolled into a prospective, non randomized clinical study. Corneal parameters examined included, full ocular examination, measurement of central corneal thickness, corneal topography, corneal curvature, and ocular refractivity. Intraocular pressure measurements were obtained using three different instruments Non Contact Tonometer, Goldmann Applanation Tonometer and Tono Pen XL (Tonopen-Central , and Tonopen-Peripheral). All measurements were performed preoperatively and 4 months post operatively.

Results: Postoperative intraocular pressure was significantly lower than preoperative values no matter which instrument was used (p value <0.001, Student's t-test). The post-operative intraocular pressure decrease was smallest using the Tonopen-XL compared to Goldmann Applanation and Non Contact Tonometer (p value <0.001,ANOVA).

Conclusion: Intraocular pressure readings are significantly reduced following corneal ablation surgery. We determined in our myopic patient cohort that the TonoPen XL intraocular pressure measurement method is the least affected following PRK and LASIK as compared to other techniques.

A NOVEL SLIT BEAM-BASED SCORING SYSTEM FOR EVALUATING CONJUNCTIVAL HYPEREMIA

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Purpose: A number of scoring systems have been developed to grade bulbar conjunctival hyperemia. They rely, however, on accessories such as reference charts or digital analysis software, and their utility in clinical practice is therefore limited. To address this issue, we have developed a simple quantitative technique in which the slit-lamp beam is used to randomly sample points on the ocular surface.

Methods: Ten ophthalmology residents were asked to evaluate three computer generated drawings representing varying degrees of conjunctival hyperemia (mild, moderate, severe). The slit-lamp beam was focused on the center of the picture and adjusted to the narrowest visible width. The points immediately adjacent to the two tips of the beam were assessed for the presence of a vessel. Twenty-four points were randomly sampled by placing the beam in four orientations (0, 45, 90, and 135 degrees) with three different lengths in each orientation. The overall score was converted to a percentage. The participants were asked to assess the technical difficulty of the technique on a 5-point Likert scale. Prior to performing the technique, the participants were asked to provide their own estimations of the degree of injection (defined as the percentage of the ocular surface area occupied by vessels).

Results: Residents were able to use the proposed technique to discriminate between the three degrees of conjunctival injection (ANOVA p-value < 0.0001, F Ratio 48.9). The consistency of the proposed scoring system was superior to the resident's subjective estimations of bulbar hyperemia (average standard deviations of 11 and 15.6% respectively). All 10 participants rated the technique as easy to perform (5 selected extremely easy, 5 selected relatively easy).

Conclusions: We have described a technique for using the slit-lamp beam to quantify the degree of bulbar injection. Our results suggest that the technique is reliable and easy to perform. It may therefore serve as a useful clinical tool for assessing and monitoring bulbar hyperemia.

TOPICAL BEVACIZUMAB FOR CORNEAL NEOVASCULARIZATION AND NEOVASCULAR GLAUCOMA

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Introduction: To investigate the efficacy of topically applied Bevacizumab (Avastin) for corneal neovascularization (NV) and neovascular glaucoma (NVG).

Patients / Methods: Patients with corneal NV or NVG were treated with topical Bevacizumab (25mg\ml) four times a day for two weeks period. Anterior segment (cornea or iris) color photos were taken at days 0 and 14. During follow up the following parameters were evaluated (days 0,3,7,14): visual acuity, intraocular pressure (IOP), anterior segment, lens, fundus, heart rate and blood pressure.

Results: Four patients with corneal NV responded to treatment accordingly - pseudophakic bullous keratopathy: moderate NV regression; pterygium: mild NV regression; Herpes simplex virus keratitis with corneal scarring: very mild NV regression; pannus secondary to blepharitis: no NV regression. Two patients with NVG secondary to ocular ischemic syndrome and central retinal vein occlusion reduced their IOP's in 43% (28mmHg to 16mmHg) and 29% (38mmHg to 27mmHg) respectively, with mild rubeosis iridis regression. The only side effect observed was temporary headache in one patient that spontaneously resolved within 1 day.

Conclusions: Short term topical administration of Bevacizumab may result in regression of corneal and iris NV in selected patients, and reduce IOP in NVG. Further long term studies are needed to fully evaluate the effects of this treatment. Supported: 1. Ministry of health, Chief Scientist Office, Israel. Grant 3-00000-4647. 2. Lirot Association.

ACCURACY OF SCHEIMPFLUG HOLLADAY EQUIVALENT KERATOMETRY READINGS AFTER CORNEAL REFRACTIVE SURGERY

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Introduction: Purpose: To determine the accuracy of Pentacam Scheimpflug Equivalent Keratometry Reading (EKR) in evaluating corneal power after corneal refractive surgery (LASIK, PRK and RK).

Patients / Methods: In this retrospective clinical study, patients who had cataract surgery after corneal refractive surgery, with no historical data underwent Scheimpflug imaging of the operated eye and the Holladay EKR was calculated at 3.0 mm and 4.5mm optical zones. The Holladay EKR together with the measured axial length (IOL master) were inserted into various IOL calculating formulas (SRK II, SRK T, Hoffer Q, Holladay I, double K SRK-T and double-K Hoffer Q) to determine the IOL power for emmetropia. This value was compared to the back-calculated IOL power that would have resulted in emetropia.

Results: Eleven patients (12 eyes) were evaluated. 10 eyes had LASIK or PRK and 2 eyes had previous RK. The mean absolute deviation from best IOL for emmetropia was minimal in the combination of 4.5 mm EKR and Hoffer Q or double K SRK T formulas. Most IOL calculation formulas resulted in an underestimation of the planned IOL for transplantation except for the double K SRK-T formula(using EKR of 3.0 or 4.5mm). The variance in deviation from best IOL for emmetropia was significantly lower in the 4.5 mm EKR and Hoffer Q or double K SRK T formulas.

Conclusions: The combination of Holladay EKR at 4.5 mm and Hofer Q or double K- SRK T formulas seems superior to the other methods for IOL calculation in post refractive surgery patients, who do not have historical data available.

Session VII - RETINA 1

TESTING THE SPREAD OF DEGENERATION FROM AFFECTED PHOTORECEPTORS TO NON-AFFECTED ONES

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Introduction: In retinitis pigmentosa (RP), there is a spread of degeneration from affected rods to healthy cones. We created a rat model of RP test the mechanisms underlying the spread of degeneration from affected photoreceptors to non-affected ones.

Patients / Methods: Two types of adeno-associated viral vector (AAVs) were constructed. (1) The plasmid pAAV-IRES-hrGFP used as a transfer vector to create an AAV with no transgene for control studies. (2) Mutated (P23H) rhodopsin gene was cloned into the pAAV-IRES-hrGFP plasmid for the experimental group. Albino rats were injected subretinally in one eye with one of the above viral vectors. The electroretinogram (ERG) was recorded monthly to assess deterioration of retinal function. Rats were sacrificed at different time intervals after the injection (one to nine months). Fluorescence analysis using confocal microscopy was used to detect GFP and localize the infected region. TUNEL was used to identify cells undergoing apoptosis. Labeling with anti GFAP, which usually expressed by Muller cells only in response to stress, was performed.

Results: With subretinal injection only a limited retinal area is exposed to the injected AAVs. Both a-wave and b-wave in pAAV-P23H-IRES-hrGFP injected eyes deteriorated gradually as degeneration spreads across the retina and reached a stable level four months post injections. At the pAAV-IRES-hrGFP (control) injected eyes there was no significant reduction in the ERG recordings. TUNEL assay showed a positive staining from three months post injection at the pAAV-P23H-IRES-hrGFP injected eyes. There was no positive staining in the control infected eyes. At the pAAV-P23H-IRES-hrGFP infected eyes there was an extended staining of GFAP far beyond the infected area, comparing to control injected eyes in which there was a positive staining only at the injected area.

Conclusions: These findings indicate that we succeeded in creating a rat model for studying the spread of degeneration from affected photoreceptors to non-affected ones.

CONTACT BETWEEN RETINAL PIGMENT EPITHELIAL (RPE) AND MICROVASCULAR ENDOTHELIAL CELLS (EC) ENHANCES ANGIOGENEIC POTENTIAL – A SIMULATION OF NON ISCHEMIC CHOROIDAL NEOVASCULAR DISEASES

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Introduction: Choroidal neovascularization (CNV) is the leading cause of vision loss in various nonischemic chorioretinal diseases such as angioid streaks, myopia and choroidal rupture. The cells involved in this phthological process are RPE cells and choroidal EC. Our aim was to investigate the interaction between RPE cells and EC in two models of coculture i.e. with and without contact, and to explore the influence of RPE cells on the angiogenic potential of EC.

Patients / Methods: RPE and EC were grown in contact or non-contact coculture for 7 days, under normoxic or hypoxic conditions. Separation of EC and RPE from contact coculture was achieved by using magnetic beads coated with antibodies specific to each cell type. Expression of EC genes involved in angiogenesis was analyzed using a real- time PCR array containing 88 genes associated with either positive or negative regulation of angiogenesis. Tube formation assay on ECM was used to study the functional effect of EC coculture with RPE. MMPs activity was examined by zymography.

Results: Coculture of EC with RPE in the contact model under normoxic conditions induced markedly upregulated EC mRNA expression of 16 genes involved in positive regulation of angiogenesis, among them VEGF, HIF -1 alpha. The expression of EC VEGF was not affected by coculture with RPE in the non-contact model. EC grown separately under conditions of hypoxia demonstrated significant upregulation in the expression of the 16 genes that were also upregulated by coculture with RPE. Following coculture with RPE in the contact model, EC demonstrated enhanced tube formation on extracellular matrix (ECM). Conditioned medium of EC and RPE grown in contact coculture exhibited enhanced MMP-2 activity, as compared to a mixture of conditioned media collected from each cell culture grown separately. In contrast, no increase in MMP-2 activity was observed in the media collected from non- contact coculture.

Conclusions: Coculture of EC with RPE cells under conditions enabling EC –RPE contact enhances the proangiogenic potential of EC under normoxia, to an extent similar to that induced by hypoxia. This data suggests that EC residing in pathologically close proximity to RPE cells may be more prone to neovascularization.

CD24 EFFECTS ON ANGIOGENESIS IN A MOUSE MODEL OF OXYGEN-INDUCED RETINOPATHY

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Introduction: CD24 is a glycoprotein involved in cells proliferation, tumor biology and metastatic spread, and might be a marker of patient prognosis. Retinopathy of prematurity (ROP) evolves in 2 stages: relative hyperoxia causes vascular remodeling and regression of preestablished vessels, followed by retinal hypoxia leading to abnormal angiogenesis and neovascularization. This research aims to find a possible involvement of CD24 in vascular remodeling, angiogenesis and ROP pathogenesis using a mouse model of oxygen-induced retinopathy.

Patients / Methods: We used 14 CD24 knockout (KO) mice and 12 normal wild type (WT) C57 black mice. Group 1 consisted of 10 mice (4 KO mice, 6 WT mice) exposed to oxygen concentrations of 75±2% from postnatal day P7 to P12. At P12 these mice were returned to room air. Group 2 consisted of 16 control mice (10 KO mice, 6 WT) raised in room air. At P17 all 26 mice were sacrified and given a perfusion of fluorescein-conjugated dextran in PBS. The retinas were flat mounted, viewed by a fluorescence microscope and photographed by a digital camera. Each retina was scored in a masked fashion using 4 parameters: blood vessels obliteration, vascular tufts formation, neovascularization (NV's) formation and vessel tortuosity. Analysis was done manualy by scoring each parameter, and digitally using a newly developded software for quantifying retinal vasculature, obtained from Dr. Andreas Stahl, Lois Smith Lab, Harvard Medical School.

Results: Overall we had 19 retinas exposed to oxygen in group 1 (7 KO, 12 WT) and 31 control retinas in group 2 (19 KO, 12 WT). The retinas of mice exposed to oxygen (group 1) had all significantly more vasoobliteration, vascular tufts, NV's and vessel tortuosity compared to the controls in room air (group 2). In group 1 the vasoobliteration area was significantly larger in the KO mice compared to the WT mice ($p<0.05$). There was no significant difference in the other 3 parameters between KO and WT mice exposed to oxygen.

Conclusions: CD24 may have a possible role in vascular remodeling and in the first phase of ROP development, but its role in the second stage of ROP and in angiogenesis is limited.

TAM SIGNALING IN RETINAL HOMEOSTASIS

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Introduction: The TAM family of Receptor Protein Tyrosine Kinases consists of three members: Tyro3, Axl and Mer. TAM receptors are implicated in homeostatic regulation of the Immune, Reproductive and Nervous systems. Mer is expressed by RPE cells, and mediates the phagocytosis of photoreceptor outer segments. Mice carrying a mutated Mer gene present with defective phagocytosis, leading to complete photoreceptor degeneration at 2 months of age. Mutations in the human orthologue Mer-tk are implicated in the retinal degeneration disease Retinitis Pigmentosa. The two ligands that bind and activate Mer are Gas6 and Protein S (ProS). In-vitro experiments suggested that Gas6 is the relevant ligand, however Gas6 KO mice do not exhibit retinal degeneration. The hypothesis that ProS is a ligand for Mer-mediated photoreceptor phagocytosis was put to test.

Patients / Methods: We generated a conditional KO mouse for ProS to investigate its role in retinal homeostasis. We generated two mouse lines mediating ProS deletion in RPE cells, and in the neural retina. Eyes from both stains were analyzed for retinal degeneration. Additionally, we generated double KO mice deleted for both ProS and Gas6 ligands to address possible ligand redundancy.

Results: ProS-deleted eyes showed only mild photoreceptor degeneration. Mice with ProS deleted in RPE cells presented with peripheral degeneration, while central degeneration was observed when ProS was deleted from the neural retina. When both Gas6 and ProS ligands were deleted, complete retinal degeneration was observed at 2 months, similar to that observed in Mer KO mice.

Conclusions: We have generated a conditional KO mouse model to assess the role of ProS in retinal homeostasis. Using this mouse model, we show that ProS is a biologically functional ligand with a key role in maintaining a balanced retinal homeostasis. Our results suggest that ProS and Gas6 act in concert to activate Mer, thus allowing for the successful phagocytosis essential to maintain healthy retinal homeostasis.

IN VIVO AND IN VITRO STUDIES ESTABLISHING HAPTOGLOBIN AS A MAJOR SUSCEPTIBILITY GENE FOR DIABETIC RETINOPATHY

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Introduction: The development of diabetic retinopathy (DR) has been related to hyperglycemia-induced oxidative stress. Haptoglobin (Hp) is an antioxidant protein as a result of its ability to bind free hemoglobin (Hb) and block Hb-induced oxidative damage. Hp also facilitates the removal of Hb from the extravascular compartment via the CD163 scavenger receptor. We have recently demonstrated that diabetic individuals homozygous for the Hp 2 allele are 5-fold more susceptible to develop DR as compared to diabetic individuals homozygous for the Hp 1 allele. This study aimed to elucidate the mechanisms underlying the correlation between Hp genotype and the development of DR both in vitro and in vivo.

Patients / Methods: We have generated transgenic mice expressing the different Hp genotypes. Retinal capillary basement membrane (RCBM) thickness in diabetic mice was assessed by electron microscopy. Differences in Hp binding capacity and scavenging of free Hb was assessed using 125I-labeled Hp-Hb complexes injected in vivo in mice and in vitro using tissue culture cells expressing CD163 receptor. The amount of Hb-derived redox active iron in the different Hp-Hb complexes was assessed using Dihydrorhodamine (DHR)-based assay.

Results: We found a highly significant increase in RCBM thickness in Hp 2 diabetic mice compared to non-diabetic and diabetic Hp 1 mice. Moreover, there was a dramatic impairment in the antioxidant properties of Hp 2 type as compared to Hp 1 type. First, We found that there was a significant reduction in Hb binding and uptake via CD163 receptor associated with Hp 2-Hb complexes both in vitro and in vivo. Second, there was a significantly greater amount of Hb-derived redox active iron associated with the Hp 2 type. Interestingly, these differences in redox active iron and Hb uptake were significantly exaggerated in the diabetic state.

Conclusions: Hp 2 allele is associated with a significant higher risk for DR both in humans and in an animal model. We have demonstrated a remarkable reduction in its antioxidant function both in vitro and in vivo. Hp phenotyping may become a useful tool to identify diabetic patients for whom antioxidant therapy may be effective in reducing the incidence and severity of DR.

DIRECTED DIFFERENTIATION OF HUMAN EMBRYONIC STEM CELLS INTO FUNCTIONAL RETINAL PIGMENT EPITHELIUM CELLS

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Introduction: Dysfunction and loss of retinal pigment epithelium (RPE) leads to degeneration of photoreceptors in age-related macular degeneration and subtypes of retinitis pigmentosa. Human embryonic stem cells (hESCs) may serve as an unlimited source for the derivation of RPE cells suitable for transplantation in these blinding conditions. The purpose of the present study was to search for conditions that will allow efficient derivation of RPE cells from hESCs, to characterize these cells in-vitro, and to assess their ability to affect the course of retinal degeneration in a rodent model of RPE dysfunction.

Methods: Differentiation of hESCs engineered to express eGFP was induced by culturing embryonic bodies (EBs) in suspension under defined culture conditions. Clusters of pigmented cells within the EBs were mechanically dissected and further cultured. Expression of RPE-specific markers in these cells was examined using RT-PCR and immunohistochemistry. For *in-vivo* transplantation, a cell suspension enriched with pigmented cells was injected into the subretinal space of dystrophic RCS rat eyes. Retinal function was assessed using electroretinography (ERG). Survival and location of the grafts, expression of RPE-specific markers, and effects on thickness of the host photoreceptor layer were examined using histological and immunohistochemical techniques.

Results: Using defined culture conditions, we were able to promote directed differentiation of hESCs toward an RPE fate. In the presence of nicotinamide, differentiation of hESCs to neural and subsequently to an RPE fate is augmented. This is further improved when factors from the TGF-b superfamily, which presumably pattern RPE development during embryogenesis, are introduced. The hESC-derived pigmented cells exhibit the morphology, marker expression, and function of authentic RPE. Following transplantation into the subretinal space of RCS rats, short and long term rescue of retinal structure and function is achieved. No teratomas or tumors were observed up to 4 months post-transplantation.

Conclusions: Directed and efficient derivation of RPE cells from hESCs can be achieved using defined culture conditions. The cells exhibit characteristics of native RPE cells, and can provide rescue in an animal model of retinal degeneration caused by RPE dysfunction. These results may serve as an important step towards the future use of hESCs to replenish and support failing RPE in blinding diseases.

SUB-TENON'S ROPIVACAINE BLOCK FOR PAIN RELIEF AFTER STRABISMUS SURGERY

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Introduction: Pain after strabismus surgery is the main cause of patient distress/dissatisfaction. We evaluated the effect of sub-Tenon block with ropivacaine on postoperative pain and analgesia requirements.

Patients / Methods: A prospective trial was conducted in 79 patients (1.0-65 years), scheduled for outpatient primary strabismus surgery with fixed sutures under general anesthesia (GA) at a major tertiary hospital. The patients were randomly allocated to receive or not to receive sub-Tenon's ropivacaine at the conclusion of the operation. Primary outcome measures were Visual Analog Scale (VAS) scores for pain at arrival to postanesthesia care unit (PACU), at discharge after 3 hours, 12-16 hours postoperatively, and 24 hours postoperatively. Pain treatment and patient's satisfaction were recorded. Data were presented as median (range). Mann-Whitney test, Pearson CHI2 test or Fisher's exact test were used for statistical analysis. AP-value of ≤ 0.05 was considered significant.

Results: There were no differences between groups in VAS scores at arrival to PACU and at discharge, and a borderline difference at 24 hours postoperatively ($p=0.06$). Twelve-sixteen hours postoperatively, VAS scores were 0.0 (range 0-5), in the study group and 4.0 (range 0-6), in the controls ($p<0.001$). The lower VAS score in the study group was associated with a lesser need for analgesia (21.9% of patients versus 57.9%, $p=0.001$; 10 doses versus 35, ($p=003$) and a higher patient satisfaction scores ($p<0.001$).

Conclusions: Sub-Tenon block with ropivacaine 0.2% at the completion of outpatient primary strabismus surgery with fixed sutures under GA reduces pain 12-16 hours postoperatively and analgesia requirements 4-23 hours postoperatively.

INTRAVITREAL BEVACIZUMAB AS A TREATMENT FOR SEVERE ROP

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Introduction: We report a retrospective consecutive case series of premature neonates who received bilateral intravitreal bevacizumab as a rescue treatment for stage 3 or 4A vascularly active ROP.

Patients / Methods: Eight premature infants with posterior ROP stage 3 or 4A, with gestational ages from 24 to 26 weeks and gestational weight from 540 to 1130 gr received bilateral intravitreal bevacizumab as a salvage treatment. The indications for the rescue treatment were: progression of ROP from stage 3 to stage 4A despite laser treatment as a preparation for lens sparing vitrectomy (one infant), progression of posterior ROP stage 2 to stage 3 with extraretinal neovascularization despite laser treatment (one infant), delayed referral with active neovascular stage 4A ROP following laser and cryo treatment before bilateral scleral buckling (one infant), anterior segment neovascularization and bleeding after laser treatment for aggressive posterior ROP (one infant), and aggressive posterior ROP with tunica vasculosa lentis and vitreous haze, preventing laser treatment (four infants).

Results: Favorable anatomical results occurred in 15 out of 16 eyes of 8 treated patients. One eye of the first patient developed macular fold. In all the eyes, the active vascular component subsided after the bevacizumab treatment. No local or systemic complications were encountered. The normal retinal vasculature developed in a delayed and different pattern.

Conclusions: Intravitreal bevacizumab may serve as an additional tool for the treatment of severe cases of ROP unresponsive to laser treatment, in cases with media opacities that preclude DLPC, in posterior ROP with tunica vasculosa lentis and in infants too sick to undergo lengthy laser treatment. The pattern of the vasculogenesis ensuing intravitreal injection is different, and should be studied. Randomized controlled studies are underway to explore the role and timing of anti VEGF therapy as an adjunct treatment to laser, or as a substitute to the ablation of the avascular retina, expecially in posterior ROP.

RESULTS OF BILATERAL MEDIAL RECTUS MUSCLE RECESSION IN CHILDREN WITH DEVELOPMENTAL DELAY

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Introduction: The purpose of our study was to asses the long-term results of bimedial rectus muscle recession (BMR) for esotropia in children with developmental delay.

Patients / Methods: A retrospective analysis of all the children with developmental delay that underwent BMR surgery for esotropia during a 15 year period was undertaken.

Results: Twenty-four children were included in our report, 10 girls and 14 boys with a mean age of 2.8 ± 2.5 years (range, 0.8-10 years) at surgery. The average follow up post bilateral medial recession surgery was 5.2± 3.2 years (range, 1- 13 years). The mean angle of esotropia before surgery was 50 ± 13.5 PD, the mean amount of medial rectus recession was 5.2± 0.65 mm, 0.43mm less than the standard amount of recession. Only 7/24 (29%) children achieved surgical success (within 10 PD of orthophoria). Among the failures, 12/17 (70%) were undercorrected and 5/17 (30%) children developed consecutive exotropia. Seven / sixteen (44%) children that required an additional surgical intervention underwent another operation. Six children had a second operation and one child had 4 operations. Among them, 2 children were still undercorreceted at the end of follow-up.

Conclusions: The main reason for surgical failure in the developmentally delayed children was undercorrection and remained so in some of the children after additional operations. It seems that it is difficult to obtain successful surgery results among children with developmental delay. Moreover, several surgical procedueres might be needed to improve ocular alignment. The aetiology of strabismus and the ideal amount of surgery in this special group should be further studied.

RETREATMENT OF RESIDUAL REFRACTIVE ERRORS AFTER MYOPIC LASIK WITH FEMTOSECOND LASER FLAPS

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Introduction: Myopic LASIK with femtosecond laser flaps is gaining increased popularity, due to the advantages of the flap thickness and architecture. Retreatment procedures may also differ as far as surgical approach and outcome. Our purpose was to evaluate results of retreatment of residual refractive errors following myopic LASIK with femtosecond laser flaps.

Patients / Methods: The data of 88 consecutive eyes from 84 patients who underwent retreatment after following myopic LASIK with femtosecond laser flaps was reviewed retrospectively.

Results: Mean time between femtosecond flap-LASIK and retreatment was 14 months (range, 6 to 45 months). The retreatment was performed by flap lift in 77.3%, by surface ablation in 20.5%, and by re-cut in 1.1%. The attempt to lift the flap failed in 4 eyes (4.5%) 9-22 months after the initial surgery, and surface ablation was performed in 3 of them while in one eye the treatment was deferred. Among the eyes with uneventful flap lift one eye required postoperative refloat due to significant mucin in the interface, and 4 eyes developed epithelial ingrowth, one of them requiring re-lift due to progression. No intra- or postoperative complications were observed in the eyes that underwent surface ablation The mean spherical equivalent (MSE) prior to primary femtosecond flap-LASIK was -4.9 ± 2.5D (range, -1 to -13D), and prior to retreatment -0.53±0.95D (range, -2.25 to +2.25D). After retreatment (mean follow-up 16.9 ±11.4 months) the MSE was +0.1±0.4D (range, -1.9 to +1.5D) with 95.4% achieving ±0.5 D and 97.7% ±1D of emmetropia. The average uncorrected visual acuity (UCVA) improved from 20/50 (range, 20/25 to 0/200) to 20/25 (range, 20/15 to 20/100).

Conclusions: Retreatment following LASIK with femtosecond laser flaps has favorable outcome with respect to safety and efficacy. Surface ablation may be a preferable option.

IMPROVING VISION IN PRESBYOPIA

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Introduction: During the last decade it has been established that perceptual learning is practical for improving visual functions (Polat 2009, Vision Research 49, 2566-73). The applicability of the gains to other visual functions, such as reading, is an important advantage of perceptual learning. In presbyopia, the visual input to the brain is limited by the optics of the eye.

Patients / Methods: We have developed a structured perceptual learning method for improvement of the visual functions in presbyopia. Subjects were trained on contrast detection of Gabor targets under backward masking conditions, posing temporal constraints on the visual processing. The subjects were trained in a dark room from a distance of 40 cm with both eyes open. The visual acuity, spatial and temporal contrast sensitivity, as well as reaction time were tested before and throughout the treatment. The subjects practice for at least two sessions of about 30 min per week. The results of the first 35 subjects (51 +/- 1 years, mean +/- se) of the on-going study that completed at least 20 sessions are presented.

Results: The results show a substantial improvement in the spatial and temporal contrast sensitivity, leading to improved processing speed of target detection as well as in reaction time. Most importantly, the improvement in other visual functions was also observed, such as the improvement of 73% in the visual acuity (more than 2 ETDRS lines). Moreover, after training, there was a real benefit for the subjects; most of them were able to read with no reading glasses. The subjects reported a subjective feeling of improvement in their daily activities as well. The gains were retained when retested several months after the cessation of the treatment.

Conclusions: The training method that is based on improving the processing speed provided the neuronal basis for improving several visual functions, including near vision. A parallel study in younger subjects provided neurophysiological support for the brain changes induced by a similar training procedure. Thus, our method is effective in improving visual functions in people with impaired or blurred vision by enhancing the image representation in the brain.

DEVELOPMENT OF VISUAL CROWDING, COLLINEAR FACILITATION AND CONTOUR DETECTION

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Introduction: Our purpose is to explore the development and maturation of the crowding effect in children and correlate it with the development of collinear facilitation and contour detection. Visual crowding is a reduction of target's visibility when it appears between other targets, an effect that is explained by different models starting from low-level lateral suppression to top-down attentional modulation. However, the development of crowding is still unclear, although it has been suggested that crowding decreases with age. Collinear facilitation is an enhancement in the visibility of a target by laterally placed collinear flankers. Recently, we have shown that, in children of up to 8 years old, facilitation is absent and replaced by suppression, but it is gradually increased between ages 8-14 years. Contour detection is remarkably improved in conjunction with the development of the collinear facilitation. Here we explored the crowding effect in young children.

Patients / Methods: We used the “Tumbling-E patterns (TeVA) test”: A LogMar chart equivalent, monitor-based paradigm: the letter E was presented in isolation or surrounded by three rows of five E-patterns each, facing one of four directions. Crowding was measured as the difference between these two measurements.

Results: We show that crowding effect is found before the age of 8 years old, gradually decreasing with age. After the age of 8, crowding reaches the normal level. Crowding is absent when the collinear facilitation is already developed.

Conclusions: It might be that in young children with normal visual system, there is a “cascade” of developmental processes, in which high levels of crowding limit the development of lateral interactions and, consequently, the contour detection. Alternatively, the visual system in children may be dominated by high degrees of suppression, which, in turn, is reflected as visual crowding. Collinear facilitation develops later and balances out the suppression. Therefore, young children demonstrate visual crowding, induced by suppression that not compensated by facilitation, with no ability of contour detection. This effect resembles the observation in strabismic amblyopia, in which crowding is a major component of the known deficit in the visual acuity, suggesting that the onset of amblyopia arrests normal maturation process of the visual system.

Session IX - Retina 2 and AMD

TREATMENT OF RETINITIS PIGMENTOSA WITH 9-CIS RETINAL – A CLINICAL TRIAL

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Introduction: High oral doses of 9-cis beta carotene were shown to improve retinal functions as measured by electroretinography and perimetry in patients with the fundus albipunctsatus form of congenital stationary night blindness. The purpose of this on-going study is to determine whether the same therapy is efficacious for retinitis pigmentosa

Patients / Methods: In a double-masked, placebo-control, cross-over trial, patients with retinitis pigmentosa (not genetically specified) were given daily 4 commercially available 15mg capsules containing powder rich in 9-cis Beta Carotene for 90 days. This was followed by a washout and a cross-over period, each of 90 days. The patients were tested for best corrected visual acuity and underwent electroretinography using an ISCEV compliant protocol and Goldmann perimetry

Results: Twelve out of 34 patients completed the study thus far and six of them showed significant improvement in scotopic and photopic ERG. The average changes were 18±12 microvolt and 7±4 microvolt respectively as compared to -1±5 microvolt and -1±3 microvolt in the cross-over period ($p=0.001$, $p=0.0003$ respectively). The difference in the visual field area was significantly larger in one treatment period [35±45 cm2] than in the other period [0±3 cm2 ($p=0.042$)]. Six patients showed no ERG or perimetry improvement in both treatment period ($p=0.914$, $p=0.934$, $p=0.423$, respectively). There were no changes in the visual acuity. The baseline scotopic ERG responses were higher in the patients of the patients who improved as compared to those that did not. (78±77 vs., 31±32, $p=0.06$).

Conclusions: It seems that 9-cis beta carotene is effective in patients with retinitis pigmentosa. Patients with more functional retina tended to show improvement. However, the treatment had no effect on some patients, probably due to 9-cis beta carotene not being relevant to some of the various pathogenic mechanisms of the disease. The results presented here have to be evaluated in patients with genetically selected forms of retinitis pigmentosa and the optimal dose has yet to be determined.

OUTCOMES OF TWENTY-GAUGE TRANSCONJUNCTIVAL SUTURELESS VITRECTOMY SURGERY

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Introduction: The use of 25-gauge and 23-gauge sutureless transconjunctival vitrectomy is increasingly becoming popular in vitreoretinal surgeries. Recently, a 20-gauge system, which allows the use of the regular 20-gauge vitrectomy instruments for a transconjunctival sutureless surgery, was presented. The purpose of this study is to assess the effectiveness and safety of the 20-gauge transconjunctival vitrectomy system in vitreous and retinal surgeries.
Patients / Methods: The charts of all patients who underwent 20-gauge suturelss vitrectomy from January 2008 to June 2009 were retrospectively reviewed. Patients were examined in the first day after the surgery and then approximately one week, one month and three months later. Demographic data, intraoperative complications and clinical examinations before and after the surgery were collected for each patient.
Results: One hundred and two eyes comprised the study population. Mean age (± standard deviation) was 66.9 ± 12.1 years (range 24-92 years). In all cases no complications related to the trocars were observed during the surgeries. In 2 cases (2%) there was need to suture one of the sclerotomies due to leakage. No eyes required conversion to the standard 20-gauge system. Mean preoperative visual acuity was 1.1 ± 0.6 (20/240, range 20/30 – light perception). Mean postoperative visual acuity improved to 0.8 ± 0.5 (20/135, range 20/20 - hand motions) ($P<0.001$) 3 months after surgery. Mean preoperative intraocular pressure was 14.7 ± 5.1 mmHg (range 2-47 mm Hg). Mean postoperative intraocular pressures were 14.2 ± 5.5 mmHg (range 3-45 mm Hg) ($P=0.48$) at day 1, 14.6 ± 4.3 mm Hg (range 6-30 mm Hg) ($P=0.82$) at week 1, 15.3 ± 3.9 mm Hg (range 8-32 mm Hg) ($P=0.76$) at month 1 and 14.8 ± 2.9 mm Hg (range 10-23 mm Hg) ($P=0.85$) at month 3. Hypotony (IOP < 6 mm Hg), which was recorded on the first postoperative day in 3 eyes (3%), was normalized spontaneously within the first postoperative week without need for intervention. Twelve (12%) patients were treated with medications for high postoperative intraocular pressures. Postoperative endophthalmitis was not noted in any of the patients.
Conclusions: Twenty-gauge sutureless transconjunctival system is effective and safe in pars plana vitrectomy.

RETROBULBAR BLOOD FLOW CHANGES IN EYES WITH DIABETIC RETINOPATHY –A 10-YEAR FOLLOW-UP STUDY

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Introduction: The aim of this study was to assess long-term changes in flow parameters of the retrobulbar vessels in diabetic patients.

Patients / Methods: This was a historical prospective study of 138 eyes that were evaluated in our institution between 1994-1995, 36 were re-evaluated between 2004-2008 and formed the study group. They were divided into four groups for comparison: eyes of diabetic patients without diabetic retinopathy (DR), eyes with nonproliferative DR (NPDR), eyes with PDR and eyes of non-diabetic patients (controls). Color Doppler imaging was used to access the retrobulbar circulation. Flow velocity in retro-bulbar vessels was measured, and the resistive index (RI) was calculated and compared between the groups and between the two time periods.

Results: There was a similar increase in the RI of the ophthalmic artery (OA) in all patient groups. RI values of the central retinal artery (CRA) and posterior ciliary artery (PCA) had increased in the two non-DR groups and in the NPDR group, with a surprising decrease measured in eyes with PDR (P=NS). Combining the NPDR and PDR groups resulted in a milder increase of the RI of the PCA and the CRA in the DR group compared to the other groups.

Conclusions: We showed that there was a decrease of the resistance in two retrobulbar vessels in patients with PDR during a long-term follow-up. The finding of a milder increase of the RI in patients with DR compared to the non-DR controls was, significant for the CRA. These results demonstrate that an increase of the resistance in the retrobulbar vessels, as a part of DR, can lessen over time and even be reversed. These results are unexpected given the direct statistical relationship between the duration of the diabetes and the severity of the retinopathy that was reported in several studies. They are, however, in line with the results of follow-up studies that were carried out using laser Doppler velocimetry. Further studies are needed in order to verify these findings and their contribution to better understanding of the pathophysiology of DR.

SAFETY AND STABILITY OF INJECTABLE MINIATURE TELESCOPIC DEVICE IMPLANTED IN RABBIT EYES

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Introduction: An intraocular telescopic device was developed to improve the central vision of patients with bilateral impairment of central vision as a result of age-related macular degeneration or other macular pathologies. This monocular device is designed for implantation in the capsular bag of patients during cataract surgery. The purpose of the current study was to evaluate the implantation procedure of a new, injectable telescopic device in rabbit eyes through a relatively small incision and to evaluate its safety and stability.

Patients / Methods: The device was implanted in ten WNZ rabbits. Follow-up examinations were conducted immediately after surgery, at one day, one week, and monthly up to 6 months. Then, eight rabbits were sacrificed and the eyes were removed and fixated in formalin for gross evaluation. Other two rabbits remained for 2 years follow-up period. The parameters that were examined included implantation procedure, device positioning relative to the cornea, pupil and the optical axis, and the general condition of the eye.

Results: The device implantation, using the injectable delivery system, was accomplished in all ten eyes. The limbal and the capsulorhexis openings were smaller than the current WA telescopic device. The implantation with the injectable delivery system was easy, fast and straightforward with no intraoperative complications. There was no evidence of any damage to the vitreous or the retina in any of the rabbits. At the end of the study the device stayed centered, stable and there were no signs of biocompatibility related complications.

Conclusions: It is safe and feasible to implant the injectable device through a relatively small incision. The injection and positioning of the device in the bag was easy, fast and straightforward. The device location was centered and stable. Device materials appear to be safe and biocompatible.

LEVELS OF CYTOKINES IN THE AQUEOUS HUMOR OF PATIENTS WITH AGE-RELATED MACULAR DEGENERATION.

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Introduction: Age-related macular degeneration (AMD) is not a typical inflammatory disease, however, there is accumulating data to suggest a critical role of inflammation and immunologic factors in the pathogenesis of AMD. The purpose of this study was to measure the concentration of multiple cytokines in the aqueous humor of patients with mild, intermediate, and advanced AMD.
Patients / Methods: Aqueous humor samples were collected from 36 eyes with AMD and 16 control eyes during cataract surgery. The level of AMD was determined clinically prior to cataract surgery. Multiple cytokines (basic-FGF, IFN-γ, Interleukin (IL)-1β, IL-10, IL-12(p70), IL-4, IL-6, IL-8, IL-17, MCP-1, TNF-α, and VEGF were measured by Luminex X-MAP technology.
Results: Thirty six patients enrolled in the study, were clinically evaluated for the level of AMD according to the AREDS criteria, as mild AMD (n=4), intermediate AMD (n=14), and advanced AMD (n=18). The advanced group was further divided into active choroidal neovascularization (CNV) (n=9), disciform scar (n=7) and central geographic atrophy (n=2). MCP-1 level was elevated in the aqueous humor in eyes with advanced AMD (mean 186±138 pg/ml) compared to control levels (mean 100±61 pg/ml, p=0.03), and specifically in eyes with active CNV (215±157pg/ml, compared to control samples (p=0.02) and compared to intermediate AMD (p=0.03)). IL-6 was found to be present in the aqueous humor of control eyes (351±516 pg/ml), with a trend of elevated levels in eyes with mild AMD (1459±1793 pg/ml, p=0.06). In the subgroup of disciform scar a trend of elevated levels compared to control levels was measured for IL-12(p70) (1.7±2.4 pg/ml, 0.2±1pg/ml, respectively, p=0.07), TNF-α (1.8±2.4 pg/ml, 0.3±1pg/ml, respectively, p=0.06) and IL-8 (4.7±6.4pg/ml, 1.2±2.1pg/ml, respectively, p=0.08).
Conclusions: The elevated levels of inflammatory cytokines in the various stages of AMD, may support the concept of inflammation as part of the pathogenesis of the disease. IL-6 may be present in the early stages of the disease; MCP-1 may have a role in the angiogenic phase, while IL-12(p70), TNF-α and IL-8 may have a role in the healing process.

ACU-4429: A VISUAL CYCLE MODULATOR BEING DEVELOPED FOR DRY AMD

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Introduction: ACU-4429 is a non-retinoid small molecule in a new class of visual cycle modulators. It inhibits the visual cycle, specifically the isomerization of all-trans-retinol to 11-cis-retinol, and animal studies have shown that it prevents the accumulation of A2E, the toxic debris which is believed to be the precursor of lipofuscin.

Patients / Methods: Two double-masked, placebo-controlled clinical trials have been conducted to assess the safety, tolerability, pharmacokinetic (PK) properties and the pharmacodynamic (PD) effect of orally administered, gradually increasing doses of ACU-4429, on the visual cycle in healthy, elderly volunteers. The PD was evaluated by measuring the suppression of the b-wave on the dark adapted ERG, after photo-bleach. In the first study, single doses of ACU-4429 were given orally from 2 mg to 75 mg in a dose-escalating fashion. In the second study, healthy volunteers were dosed for 14 consecutive days, also in a dose escalating fashion (5, 10 and 20 mg/day). Safety, tolerability and PK data were collected.

Results: In the single dose study, there was a dose-dependent effect on the visual cycle and at 60 and 75 mg - over 90% of the b-wave was suppressed. The effect started a few hours after dosing and reached its peak about 24 hours after dosing. The ERG returned to baseline 4-7 days after dosing. At the higher doses, visual complaints were encountered with increasing frequency (dyschromatopsia and delay in dark adaptation) but those were always mild to moderate and transient. The PK showed a ½ life 4 to 6 hours. In the repeat dose study, after 2 weeks of dosing there were no drug-related systemic side effects and the visual AEs were seen only at the 10 and 20 mg doses, and again, those were mild and transient. The PK data showed that steady state was reached after the first day of dosing.

Conclusions: Based on the encouraging results from these two studies, a 3 months clinical trial on patients with GA is currently ongoing.

Session X – Genetics 2

IDENTIFICATION OF A PREVALENT FOUNDER MUTATION IN AN ISRAELI MUSLIM ARAB VILLAGE CONFIRMS THE ROLE OF PRCD IN THE ETIOLOGY OF RETINITIS PIGMENTOSA IN HUMANS

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Purpose: To study the underlying cause for the high incidence rate of autosomal recessive RP in an isolated Muslim Arab village in Northern Israel.
Methods: The underlying cause for RP in the studied village was investigated by haplotype analysis in the affected families. The causative mutation was detected by direct sequencing of the underlying gene, and its prevalence in affected and unaffected individuals from the village was determined. Patients who were homozygotes for this mutation underwent ophthalmic evaluation including funduscopy and electroretinography.
Results: Autosomal recessive RP in the village was found to be linked to the PRCD gene. A missense mutation in this gene is a known cause of retinal degeneration in dogs, and has also been reported in a single human patient. In the studied village we identified a novel pathogenic nonsense mutation of PRCD (p.R22X). This founder mutation was found in a homozygous state in 18 patients from nine families, and its carrier frequency in the investigated village is 10%. The mutation is associated with a typical RP phenotype, including bone spicule-type pigment deposits and non-recordable electroretinograms. Additional findings include signs of macular degeneration and cataract.
Conclusions: The finding of p.R22X will facilitate molecular diagnosis, carrier screening, and genetic counseling in the village population. The identification of a second pathogenic mutation of PRCD in multiple RP patients confirms the role of PRCD in the etiology of RP in humans.

NOVEL NULL MUTATIONS IN THE EYS GENE ARE A FREQUENT CAUSE OF AUTOSOMAL RECESSIVE RETINITIS PIGMENTOSA IN THE ISRAELI POPULATION

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Introduction: To characterize the role of EYS, a recently identified retinal disease gene, in families with inherited retinal degenerations in the Israeli and Palestinian populations.
Patients / Methods: Clinical and molecular analyses included family history, ocular examination, full-field electroretinography (ERG), perimetry, autozygosity mapping, mutation detection, and estimation of mutation age.
Results: We performed autozygosity mapping in 171 consanguineous Israeli and Palestinian families with inherited retinal degenerations. Large homozygous regions including the EYS gene were identified in 17 of the families. EYS mutation analysis in the 17 index cases, followed by genotyping of specific mutations in additional 121 cases with inherited retinal degenerations, revealed five novel null mutations, two of which are founder mutations, in 10 Israeli and Palestinian families with autosomal recessive retinitis pigmentosa (arRP). The most common mutation we identified was a founder mutation in the Moroccan Jewish sub-population. Using the ESTIAGE program, we estimate that the most recent common ancestor lived 26 generations ago. The retinal phenotype in most patients was a typical yet relatively severe RP, with an early age of onset and non-recordable ERGs upon presentation.
Conclusions: Our results demonstrate that EYS is currently the most commonly mutated arRP gene in the Israeli population, mainly due to founder mutations. EYSmutations were associated with an RP phenotype in all patients, and we predict that the gene plays only a minor role in causing other retinal phenotypes.

THE ROLE OF LIMB DOMAIN BINDING PROTEINS IN RETINAL DEVELOPMENT

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Introduction: LIM-domain binding (Ldb) proteins are essential cofactor-proteins, which enhance transcription of LIM proteins including LIM Only (LMO) and LIM-Homeodomain (LIM-HD). Ldbs can activate or repress gene expression in a dosage dependent manner). Several LIM-HD proteins were shown to be expressed in the developing retina (e.g: Lim1, Lhx2, Lhx3, Lhx4 Islet, Islet2). Functional studies of some of these factors revealed their role in early stages of optic cup formation (Lhx2) as well as neurogenesis of several types of retinal neurons (Islet1, Lim1). Thus our hypothesis is that the Ldb proteins will display multiple functions in retinogenesis. Purpose: The aim of this study is to investigate the roles of the two mammalian Ldb proteins (Ldb1 and Ldb2) in retinogenesis.
Methods: Ldb2-/- mice do not exhibit a retinal phenotype and thus Ldb2 seems to be dispensable for retinogenesis, possibly due to redundant activity of Ldb1. Ldb1-null mice display severe anterior–posterior patterning defects and die at E9.5–10.0 due to the truncation of head structures. Thus, we employed conditional inactivation of this gene to test its roles in the retina. The phenotype of $Ldb1^{f/f}$ $Ldb2^{-/-}$;αCre was compared to that of controls. Embryos and post-natal mice were examined with Immunoflorescence on paraffin sections.
Results: During embryonic stages, control mice express high levels of Ldb1 in the neuroblastic layer. At postnatal stages, Ldb1 expression was detected in the inner nuclear (INL) and ganglion cell (GCL) layers but not in the photoreceptor layer. Ldb1-positive cells co-express Islet1 and Ap2α. The mutated retinas display ablation of Ldb1 expression in the distal retina, followed by a decrease in the expression of Islet-1. Interestingly, we did not view amacrine-cell loss, albeit specification of amacrine subtypes seemed altered. Current analysis focuses on determining the acquisition of all retinal cell fates in the Ldb1/2 mutants.
Conclusions: The presented findings reveal a role for Ldb proteins in retinal neurogenesis and for maintenance of the expression of Islet1. In turn, Islet1 is pivotal for normal differentiation of retinal bipolar-, cholinergic amacrine- and ganglion cells. We therefore expect to detect alteration in these as well as the phenotype of other retinal neurons that depend on Ldbs.

THE SENSITIVITY OF THE DEVELOPING MAMMALIAN RETINA TO HIGH DOSAGES OF THE TRANSCRIPTION FACTOR PAX6

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Introduction: The transcription factor Pax6 is the key regulator of eye development, as it is essential for eye formation in different organisms as well as sufficient to induce ectopic eyes in flies and frogs upon misexpression. Moreover, the correct dosage of Pax6 is crucial for normal eye development. The goal of this study is to elucidate the effects of Pax6 misexpression in the developing retina and the underlying molecular mechanisms.

Patients / Methods: We applied the Cre-LoxP system to conditionally misexpress Pax6 and the reporter gene LacZ in the embryonic mouse retina. Two Cre lines were employed: αCre in which Cre-recombinase is active in all retinal progenitor cells (RPCs) at the peripheral optic cup, and Crx-Cre which is specific for the photoreceptor progenitors. Immunohistochemical analysis was performed on mutant and control retinas at different embryonic stages. To study the effects of Pax6 elevation at later developmental stages, the in vivo electroporation technique was applied. P0 pups were electroporated with either pPax6-IRES-GFP or just pGFP for controls. The animals were sacrificed at P14 and the eyes were inspected.

Results: We observed a significant reduction in retina sizes upon misexpression of Pax6 during early development when using the Cre/loxP system. Quantification of apoptosis at different embryonic stages revealed a significant increase in the amount of apoptotic cells following misexpression of Pax6 among all RPCs. Elevation of Pax6 in the postnatal retina using the in vivo electroporation approach resulted in malformation of outer segments of photoreceptors that misexpress Pax6. This is in line with previously reported role of Pax6 in inhibition of photoreceptor determinant homeobox gene Crx. Moreover, postnatal elevation of Pax6 seems to alter amacrine cell morphology and possibly subtype lineages.

Conclusions: Our findings suggest that developing retina is extremely sensitive to elevation in the dosage of Pax6 leading to increased apoptosis via Caspase-3-dependent pathway at early embryonic stages, while at later stages Pax6 elevation seems to affect differentiation mechanisms in photoreceptors and amacrine interneurons.

AUTOSOMAL RECESSIVE HIGH MYOPIA AND EARLY-ONSET CATARACT IN LARGE CONSANGUINEOUS BEDOUIN KINDRED

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Introduction: We investigated clinical characteristics and molecular basis of high myopia in large consanguineous Bedouin kindred in south Israel.

Patients / Methods: Thirteen affected and 32 unaffected individuals of a consanguineous Bedouin tribe were subjected to ophthalmologic examination followed by molecular genetic analysis. All patients underwent a slit lamp biomicroscopy, indirect ophthalmoscopy, measurement of visual acuity, refractive errors, as well as examination of eye movements and ocular alignment. Genome-wide linkage analysis was undertaken on DNA samples of 18 individuals (11 of which were affected), using microsatellite markers. Fine-mapping was carried out using polymorphic markers. Sequence analysis was performed on the coding regions and intron-exon boundaries of 6 genes selected within the linked locus.

Results: The pedigree indicated an autosomal recessive inheritance. The phenotype somewhat varied amongst patients. All affected individuals presented with myopia since childhood and most had spherical equivalent between -5 and -18 diopters. Eleven patients developed cataract which warranted surgery in the first to third decade of life. In two patients, subluxated lenses were detected. Peripheral vitreo-retinal degenerative changes were found in 11 patients. Three of them (including one with mild myopia) developed intractable rheumatogenous retinal detachments leading to blindness. The disease-associated gene was mapped to ~1.7 Mb on chromosome 3q (maximum LOD score 11.5). Sequencing of the 6 genes within the defined locus identified the specific gene mutation in all affected individuals and not in 100 ethnically matched controls.

Conclusions: In large consanguineous Bedouin kindred an autosomal recessive high myopia was associated with variable expressivity of juvenile cataract and vitreoretinal degeneration. A single homozygous mutation was found to underlie this disorder.

Session XI – Cornea 2

THE EPIDEMIOLOGY OF KERATOCONUS IN ISRAEL

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Introduction: Keratoconus (KC) is a progressive non-inflammatory corneal thinning disorder of uncertain etiology. The prevalence of the disease reported in countries outside of Israel varies between 0.05% and 2.3% in the general population. Several studies suggest that both environmental and genetic factors play a role in the etiology of KC, but a definite genetic or environmental etiology has not been established. Purpose: To determine the prevalence of and risk factors for KC in the Israeli population.

Patients / Methods: We conducted a preliminary screening study of KC using videokeratography (Tomey TMS4). The study population was the student body of Hadassah College in Jerusalem, which is ethnically diverse and has both academic and non-academic programs that attract students from a wide socioeconomic spectrum. 659 students participated and filled out a self administered questionnaire aimed at assessing demographic, ethnic and risk factors. The following criteria were used to determine whether the eyes had KC: corneal aspherity, inferior steepening, irregular astigmatism and height of corneal peak. In addition, all eyes with any of these criteria were assessed using KC screening software (KSI and KPI). They eyes were divided into one of 4 categories: moderate to severe KC, early KC, KC suspect and normal.

Results: We found an unusually high prevalence of the disease (2.9%) in Israeli students, which is much higher that most previously reported elsewhere in the world. Arabs had a significantly higher prevalence of KC as compared to Jews (6.19% vs. 2.20%,P=0.04). The familial rate of KC in our study was 26%.

Conclusions: These results demonstrate that the epidemiology of KC in Israel is unique and represents a public health issue that warrants further study.

CHANGES IN CORNEAL CURVATURES AND ANTERIOR SEGMENT PARAMETERS AFTER DESCEMET STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY

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Introduction: Descemet Stripping Automated Endothelial Keratoplsty (DSAEK) has become the procedure of choice for endothelial dysfunction. This surgery entails the addition of a posterior lamellar graft containing both posterior stroma, Descemet membrane and endothelium. The transplanted lenticule is thicker then the stripped recipient's Descemet membrane and endothelium. Thus, changes in posterior corneal curvature, corneal thickness, and anterior segment structure should be expected. Such changes following DSAEK may affect the optical characteristics and refraction of the eye. Purpose: to evaluate the influence of DSAEK on corneal curvature and the anterior segment parameters obtained with the Pentacam rotating Scheimpflug camera.

Patients / Methods: A total of 9 eyes of 9 patients (3 men, 6 women) were evaluated preoperatively, and at 1, and 3 months postoperatively with the Pentacam. We compared preoperative and 1 and 3 month postoperative measurements of anterior and posterior corneal curvature, anterior and posterior corneal astigmatism, anterior chamber depth (ACD), anterior chamber volume (ACV), anterior chamber angle (ACA) width, central corneal thickness (CCT), and the corneal volume (CV).

Results: Preoperative central corneal pachymetry decreased from 687±85 microns to 631±68 microns at 3 months after surgery (p=0.07). Anterior mean K reading of the cornea changed from 43.3±1.65 Diopter before surgery to 42.7±1.5 Diopter at 3 months. (p=0.03) Anterior corneal astigmatism did not change significantly. Posterior mean K reading of the cornea steepened significantly from -5.6±0.6 Diopter preoperatively to -7.2±0.4 Diopter at 3 months. (p=0.007) Posterior corneal astigmatism changed significantly accordingly. Corneal volume increased significantly from 65.8±5.6 µl before surgery to 85.2±4.2 µl at 3 months. (p=0.007) Anterior chamber angle and depth did not change significantly following DSAEK surgery. Anterior chamber volume changed from 156.6±28.4 µl preoperatively to 126.8±26.8 µl at 3 months. (p=0.07)

Conclusions: DSAEK significantly increased posterior corneal astigmatism, posterior corneal k-reading and corneal volume, resulting in a mild hyperopic shift. This observation should be taken into consideration when performing a triple procedure.

HUMAN LIMBAL EPITHELIAL STEM CELL MARKERS EXPRESSION IN LONG-TERM REPEATED EXPLANT CULTURES FROM CORNEOSCLERAL RIMS

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Introduction: To assess the effects of repeated sequential primary culturing of human limbal explants on the properties of the cultured limbal epithelial cells.

Patients / Methods: Fresh human corneoscleral rims remaining after corneal transplantation were cut into separate explants and cultured in SHEM medium. After a period of 14 days each explant was removed from the culture dish and placed in a new culture dish. The remaining cells were fixed and immunostained with antibodies against p63 and ABCG2. Explants were re-cultured until no cellular growth was evident. The first culture was named P0, and consecutive cultures were named from P1 through P6 respectively. The percentage of positive cells for p63 and ABCG2 was recorded in the different periods from several fields and in 3 different distances from each explant (termed near, middle and edge).

Results: Positive limbal epithelial cells for p63 and ABCG2 were recorded through P5 (10 weeks culture) and P6 (12 weeks culture), respectively. There was a gradual decline of the positive cells from P0 through P6 and from the near fields through the distant fields in relation to the explant location. The percentage of p63 positive cells was 52.8% ± 20.9% at P0, 34.9% ± 20.8% at P2, 26.9% ± 22.3% at P4, and 0% at P6 ($p=0.035$, Kruskal-Wallis Test). The p63 positive cells were more abundant near the explant compared to fields at the culture edge (26.9% ± 22.3% vs. 1.7% ± 2.9% at P4, $p=0.07$, Mann-Whitney Test). The percentage of ABCG2 positive cells was 12.8% ± 6.1% at P0, 10.7% ± 3.3% at P5, and 2.1% ± 2.9% at P6 ($p=0.16$, Kruskal-Wallis Test). Significant reduction of ABCG2 positive cells was recorded in fields that were more remote from the explant location (10.7% ± 3.3% for fields near the explant compared to 1.1% ± 2.0% at the culture edge, $p= 0.07$, Mann-Whitney Test).

Conclusions: Limbal epithelial progenitor cells with typical stem cell markers can be generated from repeated sequential explant cultures. This culture system may be used to expand large viable populations of progenitor epithelial cells for the purpose of cell transplantation in patients with limbal stem cell deficiency.

THE RESPONSE OF CORNEAL EPITHELIAL STEM CELLS DURING THE ACUTE PHASE OF OCULAR CHEMICAL INJURY IN RABBITS

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Introduction: Ocular chemical injury induced by sulfur mustard (SM) is characterized by acute lesions, followed by delayed pathology, clinically characterized by epithelial defects and neovascularization (NV). We have previously shown this pathology to derive from partial limbal stem cell deficiency (LSCD). This study aimed to follow LSCD development by identifying the response of corneal epithelial stem cells, which reside at the limbus, during the acute phase of SM induced chemical injury.
Patients / Methods: Rabbit eyes were exposed to SM vapor. A clinical follow-up was carried out up to 1 week. Immuno-staining and RT-PCR of the universal stem cell marker ABCG2 and the corneal differentiation markers keratin 12 and keratin 3 were used to identify corneal stem cells and differentiated cells, respectively.
Results: Following exposure to SM vapor, corneal erosions were developed concomitant with inflammation of the anterior segment. At 1 week post exposure the erosions healed and the inflammation subsided. In naïve eyes, the ABCG2 staining was limited mainly to the basal cells of the limbal zone, and keratin 3 was seen in the cornea and in the suprabasal layers of the limbus. Following the erosions in the central cornea, an extensive proliferation of the epithelium was seen in the limbus. This was accompanied with elevation in limbal ABCG2 mRNA level and immuno-staining in the epithelium, including the suprabasal layers. At three days post exposure, when the central cornea was covered by regenerative epithelium, the limbal ABCG2 returned to baseline levels. The regenerative epithelium covering the corneal erosions was immuno-stained for both keratin3 and ABCG2.
Conclusions: The limbal epithelium was not damaged during the acute phase following SM chemical injury. The proliferation of corneal epithelial stem cells in the limbus reflected a process of corneal wound healing. These results suggest that the limbal stem cells deficiency associated with the NV following the SM induced chemical injury is not immediate, and is developed only after the healing of the acute phase.

CLINICAL AND CORNEAL BIOMECHANICAL CHANGES AFTER COLLAGEN CROSS-LINKING WITH RIBOFLAVIN AND UV IRRADIATION IN PATIENTS WITH PROGRESSIVE KERATOCONUS: LONG-TERM RESULTS

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Introduction: To assess the biomechanical and keratometric effects and the safety of treatment of progressive keratoconus with UV-Riboflavin collagen cross-linking (CXL).

Patients / Methods: This was a prospective clinical controlled study. Fourteen eyes of 14 patients with progressive keratoconus were treated with CXL following corneal deepithelization. Patients were assessed preoperatively, at week 1, month 1, 3, 6, 9, 12 and 24 after treatment. We measured UCVA & BCVA (logMAR), refraction, biomicroscopy and fundus examination, IOP, endothelial cell density (ECD), corneal topography, minimal corneal thickness (MCT), macular OCT, and corneal biomechanics with the ocular response analyzer.

Results: UCVA was 0.62±0.5, 0.78±0.6 and 0.81±0.49 before, 12 months (P=0.67) and 24 months (P=0.77) after treatment, respectively. BCVA was 0.21±0.1, 0.11±0.1 and 0.14±0.1 before, 12 months (P= 0.005) and 24 months (P=0.06) after treatment, respectively. Kmax (D) significantly decreased after treatment: 53.9±5.9, 52.1±5.0 and 51.5±5.4 before, 12 months (P=0.006) and 24 months (P=0.003) after treatment, respectively. Kcyl (D) significantly decreased: 10.2±4.1, 8.3±3.2 and 8.1±3.4 before, 12 months (P=0.03) and 24 months (P=0.01) after treatment, respectively. Mean SimK (D) remained stable: 46.2±2.8, 45.6±2.9 and 45.5±3.6 before, 12 months (P=0.14) and 24 months (P=0.2) after treatment, respectively. MCT (µm) was stable: 461±38, 478±52 and 466±46 before, 12 months (P=0.84) and 24 months (P=0.65) after treatment, respectively. No significant change was observed in ECD, corneal hysteresis and corneal resistance factor or foveal thickness. Persistent epithelial defect was observed in one case and resolved after 3 months. Corneal stromal haze was observed in 2 cases, and persisted at 24 months in one of them.

Conclusions: Two years results following UVA-Riboflavin CXL show stable visual acuity, stable corneal thickness, and significant decrease in keratometry. It appears to be a safe procedure that does not cause damage to the corneal endothelium and central retina.

SURVIVAL-RATE STATISTICS FOR EXCISION OF PTERYGIUM AND CONJUNCTIVAL AUTOGRAFT

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Introduction: Purpose: To evaluate the long term survival-rate (i.e. probability of recurrence free eye over time) after pterygium excision with conjunctival autograft.

Patients / Methods: Retrospective analysis of data was performed for patients undergoing excision of pterygium and conjunctival autograft during the years 1997-2008. The patients were invited for follow-up examinations performed by the surgeon, D.V.

Results: There were 20 recurrences of pterygium (20/181, 11.4%). This corresponded to a calculated recurrence rate of 39.1% over more than 100 months follow-up (Kaplan-Meier analysis) when taking into account estimated recurrence rates for those lost to follow up. The recurrence rate decreased with increased time from surgery. There were no major complications. The success rate improved using nylon sutures in comparison to vicryl (P=0.054). There was an average improvement of 0.075 LogMAR (from 20/31 pre-operative to 20/27 post-operative) (P<0.005).

Conclusions: Using survival-rate statistics for recurrence of pterygium in patients after pterygium excision with conjunctival autograft shows that the potential for pterygium recurrence is much greater than that reported in the current literature. Percentage of eyes that had recurrence in a study group can be misleading as a measure of surgical success.