

CURRICULUM VITAE

DONALD R. KORB, O.D., F.A.A.O.

BRIEF BIOGRAPHY

Throughout his career, Dr. Korb has divided his time between the practice of optometry and research. He has authored over 100 publications in refereed scientific journals and over 50 US patents. His inventions have resulted in 10 marketed products. He has held academic appointments at the New England College of Optometry, Boston College, Boston University Medical School and most recently Clinical Professor, School of Optometry, University of California at Berkeley.

Among his primary accomplishments of contemporary significance are:

1. The first membrane hydrophilic (soft) contact lens, the CSI lens, the grandfather of the modern soft lens;
2. The discovery and naming of Meibomian gland dysfunction (MGD);
3. The description of meibomian ductal obstruction, now recognized to be the primary cause of dry eye throughout the world;
4. The discovery and naming of giant papillary conjunctivitis (GPC) for both rigid and soft contact lenses;
5. The discovery and naming of Lid wiper epitheliopathy (LWE);
6. The discovery and naming of Non-obvious meibomian gland dysfunction (NOMGD);
7. Ocular lipid technology products, including the dry eye products *Soothe XP and Systane Balance*;
8. The LipiFlow, the first FDA cleared treatment for evaporative dry eye, the most common form of dry eye.

Korb has founded or co-founded 5 research companies, including TearScience in 2005, a company dedicated to developing metrics and treatment for evaporative dry eye. In 2011 TearScience's LipiFlow treatment was the first to be cleared by the FDA for treatment of the most common form of dry eye, evaporative dry eye. He previously founded Corneal Sciences, Inc and Ocular Research of Boston, Inc.

Included among over 30 Honors are: Regents Lecturer, University of California, Berkeley; National Optometry Hall of Fame; the annual Donald R. Korb Medal of the American Optometric Association and 2 honorary doctorates.

CONTRIBUTIONS OF CONTEMPORARY RELEVANCE

Korb's most important contributions of contemporary relevance have been in dry eye and contact lenses.

MEIBOMIAN GLAND DYSFUNCTION AND EVAPORATIVE DRY EYE

Korb discovered obstructive meibomian gland dysfunction and named the condition Meibomian Gland Dysfunction, and invented the most important treatment for meibomian gland dysfunction (MGD). MGD is now acknowledged to be the leading cause of all dry eyes throughout the world. Korb also discovered that heat could be applied directly over the inner lining of the eyelids (the palpebral lid surfaces) in concert with pulsatile pressure. This resulted in his co-invention of the LipiFlow system of treatment, the first FDA cleared treatment for the evaporative dry eye. Korb was also the primary inventor of the lipid replacement treatments for dry eye, using oil-in-water emulsions delivered to the eye by eye drops (*Soothe XP* by Bausch & Lomb and *Systane Balance* by Alcon) These contributions in dry eye have supported the shift from an aqueous based dry eye causative model to a lipid based model.

CONTACT LENSES

In contact lenses, Korb's invention of the first membrane hydrophilic (soft) contact lens for daily, therapeutic and extended wear (1972), marketed from 1980 to 2010 as the CSI lens, provided the lens design for the contemporary disposable lens.

PROFESSIONAL EDUCATION

- B.S., O.D. (Doctor of Optometry) 1962. New England College of Optometry, Boston, MA.
- Fellow, American Academy of Optometry
- Diplomate, Contact Lens Section, American Academy of Optometry

TEACHING APPOINTMENTS AND EXPERIENCE

- Private Practice with Associates
- Asst. Professor and Director, Graduate Contact Lens Program, New England College of Optometry, 1966-1968
- Special Lecturer, Boston College, Graduate School of Education, 1968-1973
- Instructor, Boston University School of Medicine, Department of Ophthalmology, 1994-2005
- Clinical Professor, School of Optometry, University of California at Berkeley, 1993-present
- Lectures and Courses – over 500 courses and invited lectures at colleges, optometric and medical schools, research foundations, scientific and professional societies in the United States and abroad.

PRINCIPAL PROFESSIONAL APPOINTMENTS

- Member, Subcommittee on Impairment of Visual Functions, Federal Office of Vocational Rehabilitation, 1962-1964
- Editor, Recent Developments, Encyclopedia of Contact Lens Practice, 1962-1964
- Member, Contact Lens Section Executive Committee, American Academy of Optometry, 1966-1973
- Chairperson, Papers Program, Contact Lens Section, American Academy of Optometry, 1966-1968
- Chairperson, Papers and Program Committee, American Academy of Optometry, 1968-1969
- Chairperson, Committee on Aid to the Partially Sighted, American Optometric Association, 1968-1971
- Member, Board of Directors, Massachusetts Society for the Prevention of Blindness, 1971-1979
- Topical Editor and Editorial Consultant, Journal of the American Optometric Assoc., 1968-1984
- Invited Founding Member, International Society for Contact Lens Research, London, England, 1980
- Invited Founding Member and Distinguished Practitioner, National Academies of Practice, 1981
- Working Group on Contact Lens Use Under Adverse Conditions, National Research Council and Committee on Vision, 1988-1991
- Chairperson, Awards Committee, American Academy of Optometry, 2000-2006
- Member, International Dry Eye Workshop, 2006-2007
- Member, International Workshop on Meibomian Gland Dysfunction, 2008-2009
- Member, Board of Trustees, Schepens Eye Research Institute, Boston, MA, 1993-present

RESEARCH AND BUSINESS EXPERIENCE

COMPANY	POSITION	YEARS
Polaroid Corporation	Project Manager and Consultant	1962-1969
Itek Corp., Lexington, MA	Director, Contact Lens Development Program	1969-1976
Corneal Sciences, Inc.	Founder, President and Director of Clinical Research	1970-1978
Syntex Corporation, Calif. (Acquired Corneal Sciences, Inc.)	Director, Corneal Sciences Contact Lens Programs	1978-1983
Koper Sciences, Inc	Founder and Director of Research	1983-1987
Ocular Research of Boston, Inc. (ORB) Developed first oil-in-water emulsion for dry eyes – Soothe XP® by Bausch & Lomb and Systane Balance by Alcon; developed DET™, Dry Eye Test, by Amcon Labs	Founder, President and Director of Clinical Research	1987 - 2005
TearScience, Inc. First FDA cleared treatment for evaporative dry eye, the <i>LipiFlow</i> . First automated interferometer, the <i>LipiView</i> .	Co-Founder and Chief Scientific Officer	2005-present

PUBLICATIONS

Over 100 peer reviewed publications, concentrated in the areas of contact lenses, meibomian gland dysfunction, dry eye and dry eye treatment, tear film ocular diagnostic tests, ocular physiology, and immunological responses of the eye. (See list of publications)

PATENTS AND INVENTIONS

Over 50 USA patents (and corresponding foreign patents) granted in the areas of dry eye treatments, ocular diagnostic equipment, visual science, contact lens polymers, contact lens designs, ocular tests for dry eye and ocular drugs and formulations.

PRINCIPAL AWARDS AND HONORS

- Inventor's Award, National Inventors Hall of Fame, 1977. Invention of the first membrane contact lens.
- Person of Vision of Year Award, Massachusetts Society for Prevention of Blindness, March 1983
- Contact Lens Person of the Year, Contact Lens Section, American Optometric Association, 1985
- Schapero Memorial Lecturer, Section on Contact Lenses, American Academy of Optometry, 1985
- Dr. William Feinbloom Award for Advancement of Visual Science and Clinical Excellence, American Academy of Optometry, December 1986
- First Memorial Morton D. Sarver Lecturer, School of Optometry, Univ. of California, Berkeley, 1987
- John C. Neill Memorial Lecturer, Pennsylvania College of Optometry, May 1988

- New England Council of Optometrists, Contact Lens Achievement Award, March 1989
- Meredith Morgan Lecturer, School of Optometry, University of California, Berkeley, 1993
- Founder's Award, Contact Lens and Cornea Section, American Academy of Optometry, 1994
- Professor Montague Ruben Research Medal, International Society for Contact Lens Research, 1995
- Regents' Lecturer, University of California, Berkeley, 1995-1996
- Kenneth W. Bell Medal, Contact Lens Society of Australia, Sydney, Australia, October 1996
- Donald R. Korb Medal for Excellence, established by the Contact Lens Section, American Optometric Association, 2000 (An annual Award since 2000)
- Dr. Josef Dallos Award, Contact Lens Manufacturers Association, 2001
- Distinguished Service Award, Massachusetts Society of Optometry, 2001
- Bronstein Memorial Award for Contact Lens Achievement, Arizona Optometric Association, 2005
- Bausch & Lomb Visionary Award, 2005
- Pioneers' Lecture, British Contact Lens Association, November, 2005
- Distinguished Service Award, New England College of Optometry, Alumni Association, 2007
- National Optometry Hall of Fame, inducted as member 2007
- University of Houston College of Optometry Award for Distinguished Research on the Cornea and Contact Lenses, 2008
- Inaugural Award and Honors Lecture, International Society of Contact Lens Specialists, 2009
- Springer Honors Lecture, University of Alabama at Birmingham, School of Optometry, 2009
- Eminent Service Award, American Academy of Optometry, 2009
- BCLA Medal, British Contact Lens Association, 2010
- Duke Medical School, Dept of Ophthalmology. Invited Lecture – A New Paradigm for Dry Eye, 2011
- University of California, Berkeley, School of Optometry, Thomas H. Peters Memorial Lecturer, 2011
- Presidential Medal, New England College of Optometry, 2013
- Award of Excellence, Global Specialty Lens Symposium, 2014
- Berkeley Hall of Fame, School of Optometry, Univ. of Cal., Berkeley, CA., induction as member 2014

HONORARY DEGREES

- Doctor of Ocular Science, New England College of Optometry, 1985
- Doctor of Science, Pennsylvania College of Optometry, 1993

PRIMARY RESEARCH ACCOMPLISHMENTS

- Development of lens fenestrations, 1962
- Discovery, nomenclature and initial description of central circular clouding, a specific form of edema resulting from wearing of PMMA contact lenses, 1962-1967
- Discovery of lid attachment rigid contact lens fitting technique, known as Korb Technique, 1970
- Initial description of motor vehicle operation utilizing telescopic prostheses by the visually handicapped, 1970
- Inventor of first membrane hydrophilic (soft) contact lens, 1972, (US Patent 3957362, marketed from 1980 to 2010 as the CSI lens)
- Inventor of first membrane (thin) contact lens for therapeutic and extended wear, 1972 (US Patent 4180308)
- Discovery and initial description of edematous corneal formations, a sequela of edema with rigid PMMA lenses, 1973
- First FDA approved clinical trial for extended wear of contact lenses (soft-hydrophilic), 1974
- Discovery, nomenclator and initial description of giant papillary conjunctivitis (GPC) for all types of contact lenses, 1977

- Development of gas-permeable rigid lens fitting technique, the Polycon 9.5 and Korb RGP technique, 1977
- Development of test for dry eye (sequential corneal staining), 1979
- Nomenclator and initial description of meibomian gland dysfunction (MGD) and obstruction, 1980
- Discovery of meibomian gland obstruction as the leading cause of dry eye states, 1980-current
- Identification of the role of the fitting and design characteristics of rigid contact lenses in the scarring and apical change processes of the keratoconic cornea, 1982
- Identification of role of eye rubbing in the development of keratoconus, 1987
- Inventor and development of the first phospholipid/oil eye formulation for the treatment of the dry eye, 1987-1990 (US Patent 4914088)
- Inventor and development of the first oil-in-water emulsion formulations for the treatment of the dry eye, 1987-1990 (US Patents 4914088; 5278151; 5578568)
- Identification of role of blinking in the formation of lipid layer thickness, 1990-1994
- Identification of role of humidity in the formation of lipid layer thickness, 1990-1994
- Discovery, nomenclator and initial description of lid wiper epitheliopathy, 2002-present
- Development of new break-up time test, the DET Test, marketed by Nomax, 2006
- Co-inventor and development of first oil-in-water metastable emulsion artificial tear product for the treatment of dry eye states and disease, marketed by Bausch and Lomb, under the name Soothe XP, 2004-present (US Patents 4914088; 5278151; 5578568)
- Co-inventor and development of oil-in-water metastable emulsion, Systane Balance, marketed by Alcon, the first artificial tear product for the treatment of all three layers of the tear film, 2010 (US Patents 4914088; 5278151; 5578568)
- Inventor of the first instrument for evaluation of functionality of meibomian glands, the meibomian gland evaluator (MGE), 2011 (US Patent Application 20080082057)
- Co-inventor of first instrument for the computerized evaluation the lipid layer thickness, the LipiView, marketed by TearScience, 2010 (US Patents 7758190; 7988294)
- Co-inventor of the LipiFlow, the first FDA approved treatment for the most common form of dry eye (evaporative), marketed by TearScience, 2010 (US Patents 7981095; 8007524)
- Discovery of lid seal during sleep - 2012
- Discovery of debridement of Line of Marx and lid margin - 2012

PRESENT ACTIVITIES

Private Practice of Optometry

Specializing in dry eye and complex ocular problems

TearScience, Inc.

Co-founder & Chief Scientific Officer, 2005-present

Present research activities dedicated to amelioration of dry eye states

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