

Biography

Krzysztof Palczewski, Ph.D.
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The global impact of blindness and visual impairment is enormous, especially in the aging population. Major causes for vision loss in addition to cataract are age related macular degeneration and glaucoma. Moreover, the increased incidence and prevalence of Type II diabetes frequently results in blindness due to retinopathy. All of these diseases can be ameliorated with newly developed systems pharmacology. The last decade has seen an impressive expansion of our knowledge about retinal photoreceptor signal transduction and regulation of the visual cycle required for normal eyesight. Substantial progress in human genetics now allows the identification of candidate genes and more complex genomic loci responsible for a variety of common retinal diseases. Technical innovations and improved methodologies in proteomics, macromolecular crystallization, and micro-imaging enhance the possibility of making even greater advances. Pharmacology, combined with structural biology of membrane proteins, holds the key for developing innovative and accessible therapies for millions robbed of their sight or those progressing toward blindness. A leader employing this multidisciplinary approach is Dr. K. Palczewski.

Krzysztof Palczewski, Ph.D., was named John H. Hord Professor and Chair of the Department of Pharmacology at Case Western Reserve University School of Medicine in Cleveland on September 1, 2005. Currently, Dr. Palczewski leads a group of 20 primary and 16 secondary faculty. Dr. Palczewski and his lab team have made several key scientific discoveries toward the understanding of phototransduction, the visual cycle, and the etiology of human blinding retinopathies. He also has served on a variety of national scientific advisory committees and the editorial boards of several well-known scientific journals. Two of his invented drugs are currently undergoing clinical trials. His contributions to vertebrate vision research include solving the structure of the light sensitive G protein-coupled receptor rhodopsin (related work won the Nobel prize in 2012 for R. Lefkowitz and B. Kobilka); identifying novel elements such as miRNAs and non-coding RNAs by massive parallel RNA sequencing of transcripts in the eye; characterizing critical visual cycle proteins; applying novel imaging and functional assays to the retina, identifying blinding genetic mutations and devising pharmacological therapies for treatment of retinal dysfunction/disease. One of the greatest contributions of the Palczewski laboratory is the large number of prospective scientists trained. These include a total more than 100 trainees at different levels (undergraduates, Ph.D., MD.-Ph.D., post-doctoral fellows, research associates, and instructors). Of these, 25 are currently independent investigators. Many have secured research grants while in his laboratory (altogether 19 mentored grants were funded including four K99/R00 and two K08s). Laboratory personnel

also have produced several issued patents (9) and many more (10) are under consideration. H factor=82 (about 26 000 citations).

Kris has been the recipient of prestigious awards like the Humboldt Research Award for Senior U.S. Scientists in 2000, a Trustee Award from The Foundation Fighting Blindness (2000), a Senior Scientific Investigator Award from Research to Prevent Blindness, Inc. (2001), and the Alcon Research Institute Award for the Year 2001. In recent years this list has been expanded by: the Knight's Cross of the Order of Merit-Republic of Poland, September 2011; Roger H. Johnson Macular Degeneration Award, University of Washington, June, 2012; John S. Diekhoff Award "Excellence in Mentoring"; 2012 Award-Foundation for Polish Sciences (the highest ranking research award in Poland); The CWRU Faculty Distinguished Researcher Award (2013); The Friedenwald Award 2014 from The Association for Research in Vision and Ophthalmology, the 2014 Maurice Saltzman Award, Mt. Sinai Health Care Foundation, Cleveland (2014), the 2014 Beckman - Argyros Award in Vision Research, and the 2015 Bressler vision research award. Of a special distinction is the fact that he is the only recipient of ARVO awards for young (Cogan) and senior (Friedenwald) investigators.

Born and raised in Poland, Krzysztof Palczewski completed his undergraduate and graduate studies in Wroclaw. First and with great enthusiasm, he studied chemistry specializing in organic chemistry. This background provided Kris a strong platform for his future successes in the biological/medical sciences. He received his Ph.D. in Biochemistry in 1986 from the Technical University of Wroclaw, focusing his research on the topography of the active site and the mononucleotide binding site of the enzyme aldolase fructose-1.6-P₂. During this period he traveled to Southern Illinois University, spending six months training in the traditional methods of protein sequencing. Work resulting from this sabbatical was selected for an award from the Polish Academy of Science and the Polish Ministry of Education.

Upon completing his Ph.D., Dr. Palczewski immediately began a four-year postdoctoral fellowship at the University of Florida with Dr. Paul Hargrave. There his primary research focused on the phosphorylation of rhodopsin, the phosphorylation of synthetic peptides, and the characterization of rhodopsin phosphates. At the conclusion of his studies in Dr. Hargrave's laboratory, Dr. Palczewski secured his first independent funding, an R29 entitled "Rhodopsin kinase: regulation, function and structure."

Next, Kris spent two years as an Assistant Scientist II at the R.S. Dow Neurological Sciences Institute at Good Samaritan Hospital & Medical Center in Portland Oregon and at the Oregon Health Sciences University in Portland as an Assistant Professor of Biochemistry and Molecular Biology. During his tenure, he was partially funded by a Jules and Doris Stein Research to Prevent Blindness Professorship. He continued to study proteins involved in phototransduction while also developing an interest in clinically relevant research. Dr. Arthur Polans and Kris collaborated in isolating and microsequencing an antigen called recoverin, which underlies a paraneoplastic disease called Cancer

Associated Retinopathy (CAR). This work led to a patent for the use of the characterized antigen in the screening of several cancers.

Upon transfer to Seattle, Dr. Palczewski spent 13 years at the University of Washington in Seattle serving in various leadership roles in the Department of Ophthalmology as well as an Adjunct Professor in the Department of Pharmacology and Professor in the Department of Chemistry. Dr. Palczewski served as an active member of the University of Washington and the international vision community. At University of Washington a strong team of investigators were assembled and major projects were accomplished including the structure of the first G protein-couple receptor rhodopsin, identification of multiple sites of phosphorylation on rhodopsin *in vivo*, discovery of the key regulators of phototransduction guanylate cyclase-activating proteins (GCAPs), restoration of sight in animal models of blinding disease such as Leber congenital amaurosis, and development of two-photon microscope to image non-invasively native fluorophores present in the eye.

Dr. Palczewski has been happily married to his wife Grazyna for 38 years and is the proud father of two sons.