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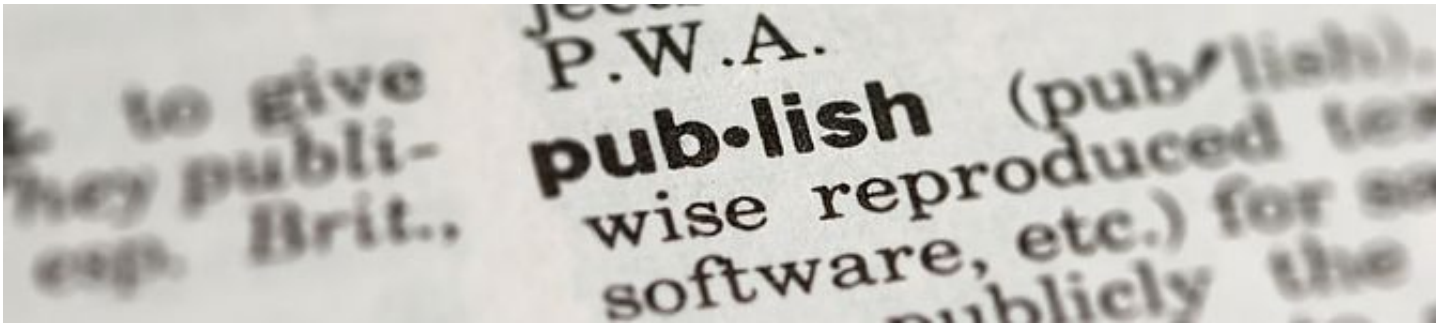
The best Publications of the Year 2019



The Vision Research community has made its decision to choose the best publications of the year 2019. The **'Publication of the Year'** reflects the personal choice and preference of the community submitted by its members. This year again we had a tremendous feedback and received suggestions from all over the world. We are very happy about these results and the enthusiasm of the community.

We are very glad to present the top ten papers of the year 2019 with the highest scores.

1 Molecular Classification and Comparative Taxonomics of Foveal and Peripheral Cells in Primate Retina.

Author/s	Peng YR, Shekhar K, Yan W, Herrmann D, Sappington A, Bryman GS, van Zyl T, Do MTH, Regev A, Sanes JR.
Journal	Cell. 2019 Feb 21;176(5):1222-123
Comment	High-acuity vision in primates, including humans, is mediated by a small central retinal region called the fovea. As more accessible organisms lack a fovea, its specialized function and its dysfunction in ocular diseases remain poorly understood. However the paper provides a framework for comparative single-cell analysis across tissue regions and species.

2 Restoration of visual function by transplantation of optogenetically engineered photoreceptors.

Author/s	Garita-Hernandez M, Lampič M, Chaffiol A, Guibbal L, Routet F, Santos-Ferreira T, Gasparini S, Borsch O, Gagliardi G, Reichman S, Picaud S, Sahel JA, Goureau O, Ader M, Dalkara D, Duebel J.
Journal	Nat Commun. 2019 Oct 4;10(1):4524
Comment	A major challenge in the treatment of retinal degenerative diseases, with the transplantation of replacement photoreceptors, is the difficulty in inducing the grafted cells to grow and maintain light sensitive outer segments in the host retina, which depends on proper interaction with the underlying retinal pigment epithelium (RPE).

3 The foveal visual representation of the primate superior colliculus

Author/s	Chih-Yang Chen, Klaus-Peter Hoffmann, Claudia Distler, and Ziad M. Hafed
Journal	Current Biology, Vol. 29, pp. 2109-2119
Comment	- Received a Dispatch in Current Biology highlighting the main results of the paper - Received two "EXCEPTIONAL" recommendations by F1000Prime faculty members. Example comment: "In addition to serving as a great example of scientific rigor, the main finding from Chen et al. (2019) may influence scientific ideas as the field continues to investigate the role of the SC in linking

perception and movement in species with foveal vision."

4

Human iPSC-derived retinas recapitulate the fetal CRB1 CRB2 complex formation an demonstrate that photoreceptors and Müller glia are targets of AAV5.

Author/s	Quinn PM, Buck TM, Mulder AA, Ohonin C, Alves CH, Vos RM, Bialecka M, van Herwaarden T, van Dijk EHC, Talib M, Freund C, Mikkers HMM, Hoeben RC, Goumans MJ, Boon CJF, Koster AJ, Chuva de Sousa Lopes SM, Jost CR, Wijnholds J
Journal	Stem Cell Reports, 2019 May 14;12(5):906-919
Comment	Manuscript describes a retinal phenotype in cultured human CRB1 patient iPSC-derived retinal organoids as previously detected in vivo in mice lacking retinal CRB1 or CRB2.

5

Transfer of the Experimental Autoimmune Glaucoma Model from Rats to Mice-New Options to Study Glaucoma Disease

Author/s	Reinehr S, Reinhard J, Wiemann S, Hesse K, Voss C, Gandej M, Dick HB, Faissner A, Joachim SC.
Journal	Int J Mol Sci. 2019 May 24;20(10). pii: E2563. doi: 10.3390/ijms20102563. PMID:31137749
Comment	The paper of Reinehr et al. shows in extraordinary way how adoption of a method to a new and better model (transfer from rat to mouse) could be performed and documented. The advances of transfering the Glaucoma Model to mice are obvious. There are clear multiple knock out mouse lines that can now be investigated and give much more and detailed information on possible ways for development of glaukoma and for treatment options for glaukoma.

6

Single-cell transcriptomics of the human retinal pigment epithelium and choroid in health and macular degeneration.

Author/s	Voigt AP, Mulfaul K, Mullin NK, Flamme-Wiese MJ, Giacalone JC, Stone EM, Tucker BA, Scheetz TE, Mullins RF.
Journal	Proc Natl Acad Sci U S A. 2019 Nov 26;116(48):24100-24107
Comment	The human retinal pigment epithelium (RPE) and choroid are complex tissues that provide crucial support to the retina. Disease affecting either of these supportive tissues can lead to irreversible blindness in the setting of

age-related macular degeneration. In this study, single-cell RNA sequencing was performed on macular and peripheral regions of RPE-choroid from 7 human donor eyes in 2 independent experiments. In the first experiment, total RPE/choroid preparations were evaluated and expression profiles specific to RPE and major choroidal cell populations were identified.

7

Objective method for measuring the macular pigment optical density in the eye

Author/s	D Christaras, H Ginis, A Pennos, J Mompean, P Artal
Journal	Biomedical Optics Express, 2019 Jun 24;10(7):3572-3583.
Comment	Macular pigment is a yellowish pigment of purely dietary origin, which is thought to have a protective role in the retina. Recently, it was linked to age-related macular degeneration and improved visual function. In this work,a method and a corresponding optical instrument for the rapid measurement of its optical density is presented.

8

Progress in treating inherited retinal diseases: Early subretinal gene therapy clinical trials and candidates for future initiatives.

Author/s	Garafalo AV, Cideciyan AV, Héon E, Sheplock R, Pearson A, WeiYang Yu C, Sumaroka A, Aguirre GD, Jacobson SG.
Journal	Prog Retin Eye Res. 2019 Dec 30:100827.
Comment	An overview of the recent reports of gene augmentation clinical trials by subretinal injections is used to reflect on the reasons why there has been limited success in this early venture into therapy. These first-in human experiences have taught that there is a need for advancing the techniques of delivery of the gene products - not only for refining further subretinal trials, but also for evaluating intravitreal delivery.

9

Age, lipofuscin and melanin oxidation affect fundus near-infrared autofluorescence.

Author/s	Taubitz Tatjana, Fang Yuan, Biesemeier Antje, Julien-Schraermeyer Sylvie, Schraermeyer Ulrich
Journal	EBioMedicine, 2019 Oct;48:592-604.
Comment	The fluorescence of the fundus is very important and is used intensively for diagnostic purposes. Until now it was believed that the short -wavelength

autofluorescence is caused by lipofuscin in the retinal pigment epithelium and the near-infrared fluorescence by melanin. The near-infrared fluorescence in particular has received a lot of attention recently because it can be used for diagnostic purposes, particularly in Stargardt patients. In Stargardt patients, a strong near-infrared autofluorescence begins to develop shortly before the visual acuity drops. Ms. Taubitz's work shows for the first time that in Stargardt patients and Stargardt mice and also in the elderly, the lipofuscin granules have a so-called mixed fluorescence in both modalities, near-infrared and short wavelengths. This paper indicates that the bisretinoids are degraded within melanolipofuscin granules. By doing this the melanosomes are oxidised with time, which is directly related to aging of the eye and thus shows the role of the melanosomes in the RPE in a new light. This is an extremely important finding that will have a major influence on ophthalmology in the near future and will contribute to the understanding and mechanisms of the aging process and the retinol metabolism as well as the degradation products of the retinol metabolism, which are the precursors of the toxic bisretinoids.

An ontological foundation for ocular phenotypes and rare eye diseases

Author/s	Sergouniotis PI, Maxime E, Leroux D, Olry A, Thompson R, Rath A, Robinson PN, Dollfus H; ERN-EYE Ontology Study Group
Journal	Orphanet J Rare Dis. 2019 Jan 9;14(1):8.
Comment	A comprehensive, structured and well-defined set of terms has been agreed on including 1106 terms relating to ocular phenotypes (HPO) and 1202 terms relating to rare eye disease nomenclature (ORDO). These terms and their relevant annotations can be accessed in www.human-phenotype-ontology.org and www.orpha.net ; comments, corrections, suggestions and requests for new terms can be made through these websites. This is an ongoing, community-driven endeavour and both HPO and ORDO are regularly updated.

Congratulation and thank you

Our congratulation goes to all winners and we may thank all contributors for their constructive submissions.

We are looking forward for the best puplications in 2020.

- Importance of scientific developments stressed by King and Queen of Spain
- Publications of the Year 2019
- Brexit – what now for universities?
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