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Title: Mechanisms of cone degeneration in the foveomacular region of the retina

Research emphasis:

Dr. Mowat's lab focuses on the cellular processes driven by oxidative injury in the retina, specifically those mediated via the hypoxia-inducible factor pathway. We are particularly interested how oxidative injury drives cone death specifically in the highly specialized central retinal region – the foveomacular area, which is particularly susceptible to disease in humans. We use a combination of animal models and cell/tissue culture to define mechanisms relevant to human macular disease.

Application :

- Canine central retinal structure/function relationships
- Primary cell culture
- Gene knockdown
- Hypoxia-inducible factors

Collaboration potential:

- Animal models of oxidative tissue injury
- Mechanisms of cell protection
- Retinal physiology

Selected publications: (limit 4)

Bainbridge JW, Mehat MS, Sundaram V, Robbie SJ, Barker SE, Ripamonti C, Georgiadis A, Mowat FM, Beattie SG, Gardner PJ, Feathers KL, Luong VA, Yzer S, Balaggan K, Viswanathan A, de Ravel TJ, Casteels I, Holder GE, Tyler N, Fitzke FW, Weleber RG, Nardini M, Moore AT, Thompson DA, Petersen-Jones SM, Michaelides M, van den Born LI, Stockman A, Smith AJ, Rubin G, Ali RR. Long-term effect of gene therapy on Leber's congenital amaurosis. *N Engl J Med.* 2015; 372: 1887-1897.

Mowat FM, Breuwer AR, Bartoe JT, Annear MJ, Zhang Z, Smith AJ, Bainbridge JW, Petersen-Jones SM, Ali RR. RPE65 gene therapy slows cone loss in Rpe65-deficient dogs. *Gene Ther.* 2013; 20: 545-555.

Mowat FM, Luhmann UF, Smith AJ, Lange C, Duran Y, Harten S, Shukla D, Maxwell PH, Ali RR, Bainbridge JW. HIF-1alpha and HIF-2alpha are differentially activated in distinct cell populations in retinal ischaemia. *PLoS One.* 2010; 5: e11103.

Mowat FM, Petersen-Jones SM, Williamson H, Williams DL, Luthert PJ, Ali RR, Bainbridge JW. Topographical characterization of cone photoreceptors and the area centralis of the canine retina. *Mol Vis.* 2008; 14: 2518-2527.