THE P2X4 RECEPTOR IS EXPRESSED ON NEURONS AND MICROGLIA IN THE MOUSE RETINA AND IS UP-REGULATED IN RETINAL DEGENERATION

Purpose:
ATP and other related purines have been found to act as transmitters at a wide range of purine receptors. Recently, the purinergic system has been implicated in the mechanisms underlying retinal degeneration (RD). This study characterised the expression of purinergic system components, the P2X4-receptor and NTPDase1, in the healthy mouse retina and determined if gene alterations are associ-ated with RD.

Method:
mmunohistochemistry and qPCR were used to assess the cellular localisation and mRNA expression level of the ATP receptor, P2X4, and the enzyme responsible for ATP hydrolysis, NTPDase1, in retinae from control (C57Bl6/J) and rd1 mouse at dif-ferent ages (P14, P30 and 9 months).

Results:
P2X4-Rs were expressed within the OPL and IPL, and both P2X4-Rs and NTPDase1 were localised on microglia in the control retina. In the rd1 retina, P2X4-R mRNA expression was up-regulated at P14 and P30, during the critical phases of photoreceptor death. Similarly, NTPDase1 mRNA expression was up-regulated at P14 in the rd1 retina. During this time point, microglia expressing P2X4-R and NTPDase1 were present in the ONL of the rd1 retina. In contrast, P2X4/NTPDase1-positive microglia were absent from the ONL of the control retina.

Conclusion:
The P2X4-R may be involved in synaptic function and immuno-surveillance in the healthy retina. However, in RD, both P2X4-R and NTPDase1 expression is up-regulated and associated with acti-vated microglia in the outer retina. These results suggest a role for the purinergic system in the mecha-nisms associated with photoreceptor death.