

The Macula, the fovea and blood supply: What do we know and how does it help?

The fovea centralis is specialization of the central retina that is associated with high acuity vision. The word 'fovea' is Latin for 'pit' – a depression in the surface of the retina. But what advantages does the pit per se confer on central vision, and how does it come about? Furthermore, are the adaptations associated with the fovea in any way linked to our vulnerability to macular degeneration? The use of new generation optical coherence tomography (OCT) has facilitated gathering of information on the morphometry of the macula and fovea in a very large sample of the population, revealing greater diversity in foveal morphology than was understood from a relatively small sample of histological specimens. In combination with molecular analyses, and data from preterm infants scanned using hand-held OCT devices, we are now beginning to understand the diversity of appearances of the fovea, and the impact of both genes and the neonatal environment on its development. We now know that during development, definition of an avascular area is a prerequisite for formation of a fovea. Furthermore, it appears that the molecular factors that define the avascular area leave the adult macula dependent on a microvasculature that is vulnerable to inflammatory events.