

Ground breaking research to end in tears

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University of Western Sydney researcher, Associate Professor Tom Millar has approached the problem of dry eyes from a new perspective. He re-examined the structure and function of natural tears to find new clues for creating longer lasting artificial tears.

Tears protect and lubricate the cornea and conjunctiva of the eye and help provide a clear medium through which we see.

Dry eyes occur when tears evaporate or break-up too quickly. Anyone can experience dry eyes, but the problem is more common when you stare at computer screens, wear contact lenses or after you turn 65. Hot dry conditions in summer, winter heating and taking antihistamines can also aggravate the condition.

Associate Professor Millar, from the School of Natural Sciences, says the interaction between the liquid tear and air holds the key to slowing the 'break-up time' of tears. "At the surface of all liquids, including tears, molecules are spread very thinly," he says. "A good example of what's happening at the micro level can be seen when you put a small drop of oil into a bowl of water. The oil spreads over the entire surface, so a little bit goes a long way. "When we looked closely at the thin surface layer of molecules on tears - the 'tear film' - we found proteins previously thought to be confined to the aqueous portion of the tear," he says.

Further study by Associate Professor Millar revealed, for the first time, proteins at the surface also played an unexpected role slowing down the break-up rate of tears. "Proteins on the tear film interact and behave

very differently. They lower the surface tension and make tears more stable," he says.

Previously it was believed lipids - released from small holes inside the eyelids - formed an oily barrier, which protected the tears from evaporating too quickly. Associate Professor Millar's discovery has opened a whole new avenue of research and is the culmination of 14 years of blood, sweat and literally tears. Over the years, he has collected samples of his own tears to extract compounds needed for experiments. Already Associate Professor Millar's research, and tears, has helped to develop a synthetic polymer, which has doubled the tear break-up time in animal trials. "The ultimate goal is to create effective eye drops which work with your natural tears to give lasting relief from dry eyes," Associate Professor Millar says.

Source: Research Australia

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