

## Keeping an eye on diabetes

Modifying contact lenses will allow easy monitoring of blood glucose levels.



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There may be no more tears for diabetes sufferers if a new glucose-detecting contact lens is successfully developed.

Diabetes is widely recognised as one of the leading causes of death and disability in the western world. With an estimated 1.4 million sufferers in the UK alone any technical developments which can improve the quality of life for sufferers are welcome.

Blood glucose monitoring is a useful tool for controlling diabetes. Currently there is no method available which allows the continuous, non-invasive measurement of blood glucose and sufferers rely on techniques such as finger pricking.

Chris Geddes and his team from the University of Maryland School of Medicine, US, present a potential solution to this problem in the form of a novel monosaccharide contact lens.

It has been known for many years that tear glucose levels track blood glucose levels, however the levels of glucose in tears are low and to date it has been difficult to determine the actual value.

To detect the tear glucose the team developed a new range of boronic acid containing fluorophores that can report the presence of glucose in tears. The glucose sensitive fluorophores are embedded into off-the-shelf contact lenses. The use of commercial contact lenses has the advantage that their physiological compatibility has already been optimised with regard to vision correction, size and oxygen/analyte permeability which should reduce future manufacturing and redesign costs.

The team show that their modified contact lenses are suitable for the continuous monitoring of tear glucose levels in the concentration range 50-500 mM which tracks blood glucose levels that are 5-10 fold higher. The team hope that this approach will offer unique opportunities for glucose monitoring for diabetics, many of whom require vision correction anyway.

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### References

R Badugu, J R Lakowicz and C D Geddes, *Analyst*, 2004 (DOI: 10.1039/ b314463c)