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## 6 Optimizing chemotaxis by measuring unbound-bound transitions

Mortimer D, Dayan P, Burrage K, Goodhill GJ.  
Physica D. 2010; 239:477-84

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Philip Maini and Ruth Baker, University of Oxford, UK. F1000 Physiology  
27 Apr 2010 | Interesting Hypothesis

6 RECOMMENDED

This paper shows that optimal chemotaxis performance of nerve fibres may be achieved when receptors signal the number of bound-unbound transitions they receive, as well as the time-averaged state. We like this paper as it uses purely theoretical methods to provide a new hypothesis for the way in which concentration gradients may be accurately measured.

The authors consider how signals from a set of chemoreceptors, interacting with a concentration gradient, can best determine the optimal direction for nerve outgrowth. They use mathematical methods to model the information measured from the number of receptor binding events in order to show that information from such events, along with time-averaged receptor occupancy, can halve the observation period required for a given level of performance compared to the use of the time-averaged information alone.

#### Competing interests

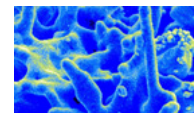
Kevin Burrage is affiliated with the same institution as Philip Maini and Ruth Baker.

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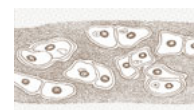
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