

Adapting to change? Remember the good, forget the bad!

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It's not easy being a bacterium and constantly having to adapt to whatever your environment throws at you. Dr Robert Endres explains how bacteria rely on their 'memories' to fine-tune their ability to sense food and danger, in his talk at the Society for General Microbiology's spring meeting in Edinburgh today.

Dr Endres and his team at Imperial College London developed a [mathematical model](#) to explain the dynamics of chemotaxis - the mechanism bacteria use to detect and respond to changes in their environment. The group tagged the surface molecules of [Escherichia coli](#) that act as 'antennas' with fluorescent labels. Tracking these labels allowed them to detect the speed at which the bacteria respond and eventually adapt to change.

The researchers found that *E. coli* adapts to potentially toxic molecules much more quickly than to beneficial molecules such as nutrients. "This makes sense since, when bacteria find themselves in unfavourable conditions, cells 'tumble' and randomly find a new direction for swimming - which is hopefully one that provides a quick escape!" said Dr Endres. "This kind of knowledge could potentially help us understand how [pathogenic bacteria](#) respond in the face of a host immune attack."

Bacteria such as *E. coli* are sensitive to even tiny changes in levels of chemicals around them. After altering their motility in response to these changes, cells must then return to their 'normal' swimming patterns. To adapt quickly, they must effectively 'forget' the initial stimulus soon

after responding to it. Conversely, bacteria that 'remember' the stimulus continue to display altered behaviour patterns and are slower to adapt.

Provided by Society for General Microbiology

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