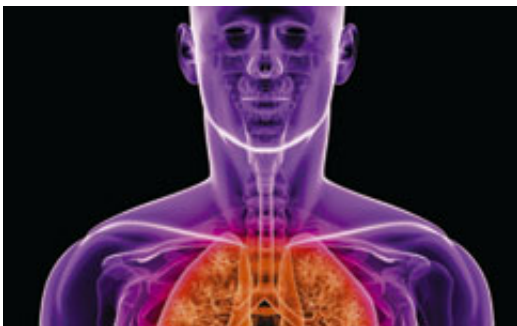


Bacteria in cystic fibrosis lung infections become selfish

March 26 2014, by Harriet Jarlett



Bacteria that infect the lungs of cystic fibrosis sufferers lose their ability to work together, becoming more selfish and less cooperative the longer the infection, say scientists.

Researchers hope that by better understanding how the potentially-fatal infection changes over time it will make it easier to treat.

The team wanted to confirm whether *Pseudomonas aeruginosa* bacteria become more inactive during chronic lung infections in [cystic fibrosis](#) patients.

'This [infection](#) is fairly special because it's very long-lived. You can normally cure a [bacterial infection](#) in a week but for people with cystic fibrosis, a [lung infection](#) can persist for years,' explains Dr Ashleigh

Griffin of the University of Oxford, lead researcher on the study published in *Plos One*.

'During chronic infections, bacteria will change their behaviour towards each other. It's interesting, because we can watch the change over time in patients.'

Griffin and her colleagues looked at four different so-called cooperative traits to see how the bacteria evolved during infections.

These included production of signal molecules bacteria use to communicate with other - called quorum sensing molecules, the concentration of protein-digesting molecules called proteases, the production of bright green pyoverdine, which is used to bind iron, and how good the bacteria were at forming biofilms. Biofilms are formed by groups of microorganisms in which cells stick to each other on a surface, in this case, a Cystic Fibrosis patients' lungs.

They found that the longer the bacteria had been infecting the lung, the fewer signals they sent out to other cells, the less biofilm they formed and the less pyoverdin they produced.

Pyoverdin is a bright green secretion which the bacteria use to bind iron, which is essential for their respiration.

'When cystic fibrosis sufferers first contract *Pseudomonas aeruginosa*, it's what you might call healthy. It's making lots of this bright green pyoverdin, but over time it becomes very pale and quiet, as it's not making this molecule and it doesn't send out many signals. It seems odd because not communicating is not usually in the bacteria's best interest,' Griffin says.

Griffin explains that people have been very sceptical of the idea that the

bacteria are getting themselves into a hole, where they can't make these molecules and the team have encountered resistance to this idea.

The team are now interested to understand whether the bacteria are adapting to the lung environment or forced to behave in a way that may harm them by competition with neighbouring bacterial cells of their own species. They think there may be alternative explanations for what they've seen.

'If bacteria don't need iron because the lung is an iron-rich environment, then they won't need to make this pyoverdine, or something else may be happening that means they don't need to signal to one another as much,' Griffin explains.

By understanding how these [bacteria](#) evolve, and why they choose certain behaviours over others, will make it easier for treatments to eventually be found.

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