Tuesday 12 September 2017

Medical technology joins the fight against pollution

Technologies that have been pioneered for medicine, such as detection of infectious diseases and cancer, and genetic testing, have been adapted for environmental clean up.

For decades, scientists have used naturally occurring microbes to help clean up contaminated sites. Now, a visiting US researcher says that probing changes in the nuclei of microbes can identify the best microbes for the task and how well they are performing.

'In laboratories, we use molecular biological tools – a range of laboratory analyses – to evaluate biodegradation potential of microbes and microbial activity at contaminated sites,' said Ms Dora Taggart, President of Microbial Insights. 'The analyses are performed directly on cellular biomolecules including DNA, RNA, phospholipids, and proteins.'

'The microbes – bacteria and fungi – are typically already present in the soil, or we can add them. But you need the right conditions in order to ensure that the microbes survive; you need to ensure that the chemistry is right. Often, adding electron acceptors such as oxygen, or electron donors or changing the acidity allows nature to take over and the naturally occurring organisms will be stimulated and start to degrade the contaminants of concern.'

'The approach is completely natural. Think of it as the "final polishing" after the pollution source has been removed.'

Molecular biological tools include technologies that measure microbial populations and activity.

'There is enormous potential for these tools to improve the design, performance, and tracking of bioremediation, helping us to save money as we manage sites more effectively' says Ms Taggart.

'We extract DNA from naturally occurring microbes and analyse it. We can identify the precise genes that are involved in breaking down contaminants.'

Researchers pioneered 'green remediation' in the 1990s to remove pollution from groundwater. The technique proved to be effective at destroying a range of chlorinated solvents.

'Bioremediation works well for many pollutants. Microbes will degrade chlorinated hydrocarbons from dry cleaning solvents, degreasers, gasoline and diesel products,' says Ms Taggart.

‘We don’t know if there are any bacteria or fungi that will work with PFAS. I’d be surprised if we can’t find something that will biograde these compounds. But at the moment we don’t know the organisms or the pathways.’

Ms Taggart will present her paper, *The state of molecular biological tools: leaps forward and lessons learned* on Tuesday afternoon at CleanUp 2017. CleanUp 2017 – the 7th International Contaminated Site Remediation Conference – is organised by CRC CARE and is being held in Melbourne from 11 to 13 September. The conference program is available at www.cleanupconference.com/program.

Media assistance:
Paul Holper, Scientell, 0407 394 661; paul@scientell.com.au