

Making bacteria make useful proteins

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By adapting a single protein on the surface of the bacterium *Caulobacter crescentus*, researchers at the University of British Columbia have turned it into a protein production factory, making useful proteins that can act as vaccines and drugs. Dr. John Smit presented the findings at the Society for General Microbiology's meeting at Heriot-Watt University, Edinburgh, today (7 September).

C. crescentus is a harmless bacterium that has a single protein layer on its surface. Dr Smit's team adapted the system that secretes this protein, which self-assembles into a structure called the "S-layer", to secrete instead many proteins that are useful for vaccines and other therapeutic purposes. Or, by keeping the S-layer protein intact and genetically inserting new things inside it, they produce a very dense display of useful proteins on the cell surface and then expect to use the entire bacterium in a therapeutic application.

Bacteria are commonly used in biotechnology to produce useful protein products. If the bacteria secrete the protein rather than keep it contained within the cell, purification costs are greatly lowered. The researchers have developed a commercially available kit based on this technology, which could be especially useful in developing countries as it might be used to manufacture HIV-blocking agents very cheaply and with little specialist expertise.

"This S-layer system is very efficient at producing and secreting proteins - we can make the [bacterium](#) into a protein pump, secreting over half of all the protein it makes as engineered S-layer [protein](#)," said Dr Smit,

"Applications of S-layer display that we are currently developing include anti-cancer vaccines, an [HIV infection](#) blocker and agents to treat Crohn's and colitis, and [diarrhoea](#) in malnourished populations".

Source: Society for General Microbiology

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