

# Research another step towards orthopaedic implants made from shell

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(PhysOrg.com) -- Victoria University PhD research could ultimately result in the creation of orthopaedic implants made of material that is eventually replaced by bone.

Dr Benjamin Matthewson, who graduated with a PhD in Chemistry at Victoria's May graduation ceremony, spent five years investigating sea urchin [shell](#), in particular the spikes, in order to find out how its interior is formed.

"The 'Swiss cheese-like' interior of sea urchin spikes is especially difficult to recreate, because they have a curved structure," says Dr Matthewson.

"Macromolecules inside the spike control how the shell grows, so I set out to find out how nature controls the spike shape."

Dr Matthewson's work discovered certain parts of the [macromolecules](#) structure were not important for controlling shell shape. This is a significant finding, as it brings scientists further down the track towards learning how to create orthopaedic implants made of shell.

"Previous scientific research shows that if you take some shell and you put it into a sheep in an area where [bone](#) grows, the body treats it like bone, replacing the shell with bone. And even though it's a foreign body, there is no immune rejection."

Dr Matthewson says a first step in improving orthopaedic implants might be to coat orthopaedic screws with seashell, which would create a better join. Current research at Victoria University by Dr Matthewson's supervisor Dr Kate McGrath involves growing sheets of shell, with the intention of wrapping implants in shell, which could help with the integration of the implant into the body.

"A lot of the problem is that the titanium and the bone don't match in strength - so this new method would create more fusing, more integration, and hopefully a longer lifetime," says Dr Matthewson.

"Currently implants last about 10 years - then the implant starts breaking the bone around it and has to be replaced - it is therefore likely that this will be done multiple times for the same joint in a person's lifetime.

"You'd still receive surgery and get an implant put in, but it would be made of material that the body thinks is bone, enabling it to actually become bone over time."

Provided by Victoria University

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