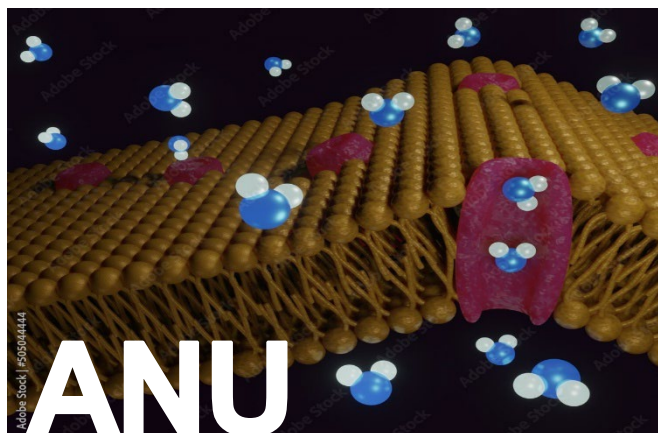


## Engineered plant membrane proteins to selectively concentrate elements from water



Adobe stock Image #505044444

Remediation of mine sites or other waste water facilities can cost 100's of millions to clean, with little or no added value.

ANU start-up, MTE, develops protein components for highly specific element and nutrient separation from complex solutions for waste water remediation and crop improvement purposes, thus allows the purification and reuse of minerals and precious metals.

Proteins have been produced that are selective for lithium, boron, iron, zinc and various minerals for fertilizers. The team is continuing to expand the range of minerals the system is selective for and will develop for industry need.

### Technology (TT2019-056)

MTE have designed novel protein components and tested the function of hundreds of naturally occurring diverse membrane proteins using cutting-edge and highly specialised approaches. MTE engineers value-adding components for advancing membrane separation technologies. The components MTE creates can be embedded in membrane-based filtration systems for gaining new functions and used in critical mineral processing, and MTE deliver components that can be incorporated in plant cell membranes for improving crop performance.

### Potential benefits

- > **Element Specific:** the protein channel is selected and engineered to be specific to one element
- > **Modular:** cartridges can be stacked to purify multiple elements from the same solution
- > **Low cost:** proteins are engineered using standard cellular fermentation processes
- > **High purity:** enable waste to be processed into purified metal, mineral and clean water resources
- > **Longevity:** cationic surface reduces risk of membrane clogging

### Potential applications

- > Mining
- > Agriculture
- > Waste water
- > Industrial chemical waste

### Opportunity

ANU is seeking external partners to fund new selective proteins, to trial existing proteins and to optimise the membrane cartridges.

### IP status

The IP is owned by the ANU

### Key research team / Publication

- > Caitlin Byrt, Samantha McGaughey, Annamaria De Rosa; Research School of Biology
- > <https://nph.onlinelibrary.wiley.com/doi/epdf/10.1111/nph.18762>

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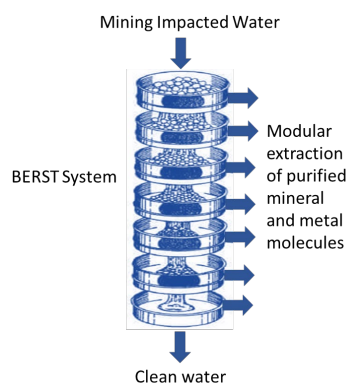


Figure 1: Bioderived Element Resource Separation Technology