

Novel transparent protein bio-materials with versatile applications

New bio-materials comprised of crystallin proteins being developed for ocular surgery and stem cell delivery applications.

Technology

Researchers at the University of Auckland have developed a new suite of protein-based biomaterials formulated from crystallin proteins. In vivo, crystallin proteins are the major protein in the eye lens, where their role is to maintain lens stability and transparency. Because of this, crystallin-based biomaterials will have unique optical properties – superior to other protein biomaterials.

Crystallin proteins have in vivo therapeutic properties, including anti-inflammatory, anti-apoptotic, anti-platelet, anti-aggregation and cytoskeletal stabilization.

Crystallin biomaterials are biocompatible and additives such as plasticizers, cross-linking molecules and other polymers may be included with the soluble crystallin protein to produce materials of tunable format, mechanical properties, and degradation rate.

These materials have wide-ranging applications, from biomedical engineering to packaging.

Major advantages

- Large scale production of protein derived from a natural source.
- Form transparent biomaterials.
- Tunable format, including adhesive gels, thin films, and fibres.
- Biocompatible.
- Can be gamma sterilised to medical grade for implants.
- Biodegradable.
- Some maintenance of *in vivo* therapeutic properties.

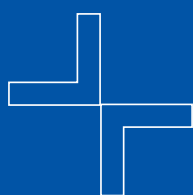
Applications

These novel biomaterials have a number of potential applications:

- Potential replacement for amniotic membrane in multiple therapeutic scenarios
- Drug eluting soft contact lenses (e.g. anti-inflammatory agents or antibiotics)
- Corneal shields or bandages for human and animal health applications
- Adhesive glue for eye surgery
- Ocular stem cell delivery (e.g. for the treatment of limbal stem cell deficiency)

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UniServices by the numbers

Total external research funding:

\$261.3M

(35% increase over 2020)

45

companies started in the past five years

\$1.25BN

Total market capitalisation of companies formed

\$73.5M

Net asset value of the University of Auckland Inventors' Fund

17,335 Covid-19 vaccinators trained by the Immunisation Advisory Centre in 2021

1,700

New Zealand teachers reskilled and upskilled through Tui Tuia | Learning Circle professional learning and development in 2021

3,000

clinical staff at 22 DHBs trained through teamwork-based acute care simulations designed by NetworkZ in the past five years

14,391 times that child and youth mental health workers attended Whāraurau e-modules, trainings and workshops in 2021

UniServices

UniServices is a not-for-profit company of the University of Auckland that champions research and ideas with the power to change the world. From seeking out and bringing together partners in academic institutions, industry and government to build new knowledge and solutions through research; to whakatupu (nurturing) and commercialising the ideas and intellectual property that arise from the University of Auckland's great minds, we act as the kaihono (those who join and link people to people, and people to projects) firmly entrenched in the ecosystem that bridges the world of academia with business, government and our communities.

University of Auckland

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