

FORODERM™

Painless, low cost & safe bioactive delivery system

UNIQUEST

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What is UniQuest Pty Ltd?

UniQuest is the main commercialisation company (technology transfer office) of the University of Queensland, Australia. UniQuest's innovation portfolio includes Australia's first blockbuster vaccine Gardasil®, Australia's largest biotech IPO QRxPharma Ltd, the internationally acclaimed Triple P Positive Parenting Program, and UQ's superconductor technology used in two-thirds of the world's MRI machines.

Technology Overview

Foroderm™ is a platform technology consisting of a novel elongate microparticle (EMP) delivery system for the cutaneous delivery of a wide range of payloads including small molecules, peptides, proteins, vaccines, nutraceuticals and cosmetics. The microparticles are not attached to any solid support allowing application to large areas of skin. Penetration of the *stratum corneum* by the microparticles creates pathways for the delivery of a range of bioactives including higher molecular weight compounds such as proteins. Foroderm™ can also be used to deliver bioactive agents to mucosal surfaces.

Foroderm™ can be added directly to existing topical formulations (e.g. solutions, gels, cream, ointments etc).

Product Opportunity

Foroderm™ displays a number of unique selling points:

- Application is by gentle massage – no applicator or penetration enhancers are required
- Painless
- Can be added to a range of existing formulations including ointments, solutions, creams and gels.
- Can be used for cutaneous delivery of a bioactive over a large skin area (e.g. a whole back or forearm)
- Minimal post application erythema is evident at the application site
- The microparticles are removed within a ~3 week period via natural turnover of the skin.
- Low cost manufacture at high volume
- Can be used to deliver a wide range of structurally unrelated active pharmaceutical ingredients (API) including peptides and small molecules.
- Penetration depth can be controlled depending on the delivery requirements of the bioactive

Foroderm™ is a platform technology with a wide range of potential applications, including:

- Delivery of dermatologically relevant API and cosmeceuticals
- Delivery of vaccines
- Delivery of pain-related therapeutics (e.g. lower back pain, osteoarthritic pain, post-herpetic pain)

- Animal health (e.g. herd vaccination)
- Delivery of peptides and proteins
- Delivery across mucosal surfaces (e.g. intestinal, oral, vaginal)

Competitive technologies include those associated with a higher pain profile such as injection, the use of dermarollers, dermal ablation or chemical penetration enhancers. Foroderm™ removes the requirement for the external power supply required by sonophoresis and iontophoresis. Foroderm™ is complementary to microneedle patches that are largely utilised for focal delivery.

Current Status & Development Requirements

Data has been generated using microparticles manufactured from either silica or silicon, showing:

- The composition of the microparticles, including geometry
- The minimal application force required to increase skin penetration with Foroderm™ microparticles
- The removal of the microparticles by natural skin turnover
- The ability of the microparticles to significantly increase the skin penetration of the fluorescent dye compound, sodium fluorescein (NaF) in a range of skin models including excised pig skin, excised human skin, healthy volunteers and in miniature pigs.
- The ability of the Foroderm™ microparticles to significantly enhance the skin penetration of a range of dermatologically relevant small molecules including nicotinamide (vitamin B3), vitamin A and the photodynamic therapy drug, aminolevulinic acid.
- The way in which a significantly increased IgG titre response is observed in mice administered a live DNA-based vaccine with Foroderm™ compared to intramuscular delivery.
- Successful inoculation and significantly increased immune response in an animal model administered a particulate, killed virus vaccine.

Intellectual Property

There is a 'composition of matter' PCT application entitled "*Method and Composition for delivering a compound through a biological barrier*" (priority date 22 June 2012, WO/2013/188926) that discloses the composition and use of Foroderm™.

Although the microparticles can be used to deliver bioactive agents without the use of an applicator a proprietary applicator has been found to further increase skin penetration of a range of small molecules. The applicator design is disclosed in a PCT application entitled "*Applicator*" (priority date 21 December 2012, PCT/AU2013/001505).

What are we looking for?

We are seeking licensees in various application fields. UniQuest would be interested in speaking with parties interested in sponsoring a research program associated with their field of interest with an option to license the background intellectual property. Interested parties may include drug reformulators interested in a patented drug delivery system, biotechnology companies requiring an efficient and effective delivery system for biopolymers or vaccines, or specialist pharmaceutical companies requiring field delivery of API.