



The Burnet Institute is the largest independent research institute for infectious diseases, immunology and public health in the Southern Hemisphere.



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Mannan DNA/RNA/SiRNA delivery system

For gene therapy and the development of nucleotide vaccines

Summary of the Opportunity

A partnering opportunity exists with the Burnet Institute to assist in the commercialisation of its proprietary mannan nucleotide delivery system.

This project describes the use of mannan covalently linked to DNA or RNA to deliver them into cells via the mannose receptor; cells that are mannose receptor positive (MR+) (macrophages, dendritic cells, endothelial cells and others).

This delivery system has applications in the development of DNA/RNA vaccines, gene therapy as well as the delivery of siRNA.

Researchers at the Burnet Institute have determined that:

- Mannan, when oxidised and reduced, can deliver both DNA and RNA/SiRNA into cells via the mannose receptor. **Provides a targeted approach.**
- Primes both arms of the immune system and has **been validated in a cancer vaccine model in mice.**
- The binding uptake efficiency of the mannan conjugates is **efficient and fast.**
- **Non-viral nucleotide delivery system** that has applications in DNA/RNA vaccines and gene therapy (including SiRNA).
- Adjuvant has been administered to over 100 humans without adverse effects

Background

The development of an inexpensive, safe, readily applicable gene transfer system, efficient in transgene expression and able to target a cell type of choice *in vivo*, is crucial to the success of both polynucleotide-based genetic vaccines, eg DNA vaccines, and gene therapy.

Retroviral systems are often used as they are highly efficient at transfecting genetic material into cells. However there are concerns over their safety in humans.

Researchers at the Burnet Institute, (Austin campus) have discovered a targeted non-viral delivery system that involves using mannan conjugated to nucleotides entering cells via the mannose receptor.

In vitro experiments showed:

- The binding uptake efficiency of OxMan-PLL and RedMan-PLL DC's and macrophages was efficient and fast.
- Found enhanced transfection efficiency by OxMan-PLL over RedMan-PLL.
- *In vivo* studies in a mouse cancer model showed that by injecting DNA complexed to Ox-Man and Red-Man vial PLL.
 - At low DNA doses OxMan-PLL-DNA and Red Man-PLL-DNA induced CD8+ and CD4+ responses respectively.
 - At higher doses both CD8+ and CD4+ immune responses were induced

Patent Position

The Burnet Institute has an IP position relating to the method of use of mannan as a delivery system/ adjuvant for the delivery of nucleotides (DNA/RNA/SiRNA) into cells.

Granted patents will have patent protection beyond 2020.

Patent no: PCT/AU04/001564

The Burnet also has extensive proprietary know how relating to the conjugation of candidate nucleotides to mannan.

For further information on this Partnering Opportunity Contact:

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