

## A dense-gas solvent exchange process (DGSEP)

### Business Opportunity

Researchers at the University of New South Wales (UNSW) have developed a process to form a polymer hydrogel matrix containing an active pharmaceutical ingredient. This process overcomes the issues inherent in conventional techniques used for hydrogel preparation (these include labour intensive processes, high residual solvent content, and high temperatures needed).

In particular this process has been designed to overcome the problems associated with impregnation of an active ingredient into a polymer with polar characteristics and semi-crystalline nature whilst at the same time fabricating a porous polymer. The process allows for the simultaneous creation of a stable porous polymer hydrogel impregnated with an active pharmaceutical ingredient (amorphous form of the drug).

### The Market

The drug delivery market is in a growth phase, with revenues greater than US\$2bn in 2005. It is expected that the market will grow to approximately US\$5bn by 2012, with CAGR of 6%<sup>1</sup>.

A subcategory of the drug delivery market for this technology is that of ocular drug delivery through contact lens and similar products, addressing a US\$7bn market with a CAGR of 5.4% (2006 figures).

### The Technology

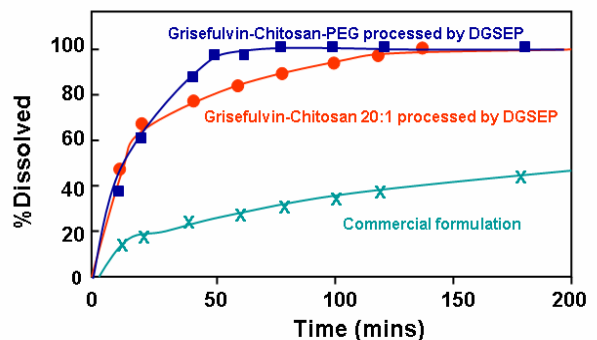
This technology is a single step, room temperature, solvent free process for the formation of a highly interconnected porous chitosan. This can be impregnated with one or more active ingredients.

In a proof-of-concept study, the Active Pharmaceutical Ingredient (API), Griseofulvin, was embedded in the chitosan porous structure in an amorphous form.

<sup>1</sup> Frost and Sullivan 'United States drug delivery technology markets'.

The amorphous form of the drug was stable for a period of at least 6-months.

At optimum processing conditions, 83% drug dissolution was achieved in 60 minutes and **complete dissolution reached in 180 minutes using this chitosan-griseofulvin processed by DGSEP**. This is a significant improvement compared with products in the market which, in 180 minutes have only 40% of the drug in the formulation dissolved.



Increased dissolution caused by increase in surface area and increased wettability of the hydrophilic polymer.

### The Team

A multidisciplinary team of highly regarded researchers lead by Prof Neil Foster, including Prof. Laura Poole-Warren, Prof Fariba Dehghani, and PhD Candidate Angela Barrett developed this process.

### Investment Opportunity

NSi is looking for an industry partner to license the technology and assist to fund further R&D proof of concept.

An Australian provisional patent application was filed in April 08.

### Further Information:

**Dr. Alfredo Martinez-Coll**  
Business Development Manager

T: +61 2 9385 4679

E: [a.martinez-coll@nsinnovations.com.au](mailto:a.martinez-coll@nsinnovations.com.au)

Ref: 07\_2165