

Novel therapies for treatment of inflammatory gastrointestinal diseases

Description of Technology

The Gut Immunology Group of the Rowett Research Institute have discovered the potent anti-inflammatory function of *Bacteroides thetaiotaomicron*, a natural non-pathogenic inhabitant of the human gut, and have demonstrated its biological efficacy in acute models of inflammation.

The bacterium and products derived from it could have significant therapeutic benefits in the treatment of human inflammatory bowel disease (IBD), Ulcerative Colitis (UC) and Crohn's Disease (CD). Whilst genetic predisposition is recognised, both the gut microflora and the immune system are implicated in the pathophysiology of IBD.

The mode of action has been shown (Nature Immunology in January 2004 (Vol 5 No1 P104-112) to involve secretion of a novel bacteria product that modulates the function of gut cell proteins, nuclear factor-kappaB (NF- κ B) and peroxisome proliferator activated receptor gamma (PPAR γ), inhibiting their ability to trigger inflammatory gene transcription.

Requirements of anti-inflammatory technology

There is currently no cure for IBD and treatments mainly consist of suppressing the inflammatory response to control symptoms. Aminosalicylates, corticosteroids, antibiotics and immunosuppressants are all commonly used but are typically ineffective with patients presenting either as unresponsive or with secondary effects. There are significant market opportunities for development of biologic therapeutics based on an understanding of how the body naturally maintains immune homeostasis in the gut. The use of beneficial bacteria (probiotic therapy) offers an early opportunity which with an understanding of the associated biological products opens opportunities for a new generation of pharmaceutical therapeutics.

Highlights of the Technology

Potential for probiotic pharmaceutical therapies

Probiotic based on naturally occurring inhabitant of healthy human gut.

Elucidated mode of action for active bacteria in acute inflammation

Potential of reduced or removed risk of side effects associated with current therapies

Development Status

The activity of *B thetaiotaomicron* has been demonstrated in acute models of inflammation and its mode of action elucidated. Verification of its related activity is to be undertaken in models of chronic inflammation mimicking UC and CD. Further proteomics studies are planned to further elucidate the structure of gene products as a precursor to modelling and development of therapeutic products.

Therapeutic Targets

Inflammatory Bowel Disease
Ulcerative Colitis
Crohn's Disease

The technology has the potential to be developed for other inflammatory applications including those outside the human gut.

Patent Status

A Patent application has been filed and is subject to international filings under the Patent Co-operation Treaty as PCT/GB2002/05255. The patent incorporates methods for the treatment of inflammatory cytokine production with a therapeutic dose of *B thetaiotaomicron* and products derived from it.

Relevant publications

The following publication details the research underpinning the technology and the patent:

Kelly *at al*, Nature Immunology January 2004

Relationships sought

Strategic alliances and/or joint ventures are sought to realise the full potential of the technology in acute and chronic indications.

Licenses are available to the technology covered by the Patent Application and to the associated Rowett know-how for application areas.

If desired an initial feasibility study to validate the technology for specific application could be undertaken.