invent DCU
INNOVATION & ENTERPRISE

Dublin City University
Partnering Opportunity

LIFE SCIENCES

Advancing the development of a novel compound for the treatment of inflammatory disease

INTRODUCTION

As a strategic unit located within Dublin City University's (DCU's) Faculty of Science and Health, DCU's School of Biotechnology's areas of expertise include Bioprocess Engineering, Biochemistry, Microbiology, Genetics, Bioinformatics, Immunology, Virology and Molecular Cell Biology. The Immunomodulation Research Group in the School of Biotechnology is led by Professor Christine Loscher. Prof Loscher's team has significant expertise in investigating disease mechanisms and potential new therapies for autoimmune and inflammatory diseases.

TECHNOLOGY DESCRIPTION

The team at DCU and colleagues at UCD have identified that a compound purified from a marine species, exerts potent anti-inflammatory activity. The mechanism of action has been elucidated and the team have shown that the intracellular target for this compound is an adaptor protein involved in a key pathway in the immune system, the toll-like receptor (TLR) pathway. There are a number of TLRs and they each recognise a different class of pathogen and subsequently activate the immune system. The specific target that has been identified is exclusively associated with TLR2 and TLR4 which play a major role in inflammatory disease. The specificity of the molecular target provides the opportunity for the targeting of inflammation in a range of disease states, but also allows for the normal functioning of much of the immune defense against infection.

The lead compound has been shown to have anti-inflammatory activity *in vivo* and has been shown to be ideal in its current form for topical application. It is currently being developed as a topical anti-inflammatory for atopic dermatitis. A "clinical ready" formulation of the lead compound suitable for topical application has been developed and a number of pre-clinical toxicology studies have been performed. The compound has shown promising results in a murine model of atopic dermatitis.

In addition other analogues have been designed specifically to be suitable for oral delivery. They will be tested for anti-inflammatory activity and have significant potential for use in other anti-inflammatory diseases such as Rheumatoid arthritis and Inflammatory Bowel Disease.

IP STATUS

A patent application was filed in May 2015 – Publication Number WO2016185025

TYPE OF BUSINESS SOUGHT

We are interested to talk to companies interested in collaborations and strategic partnerships.

DCU

CONTACTS

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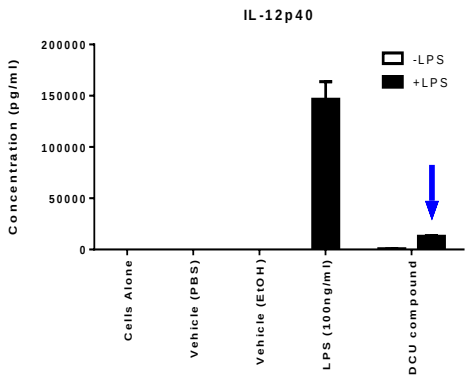
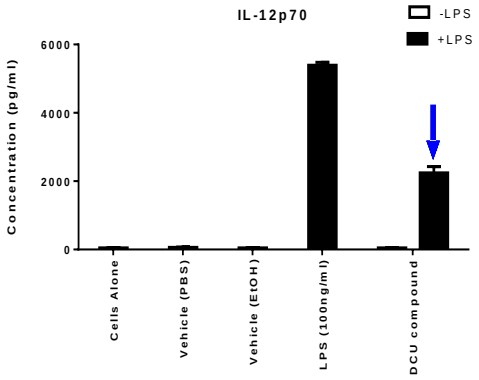
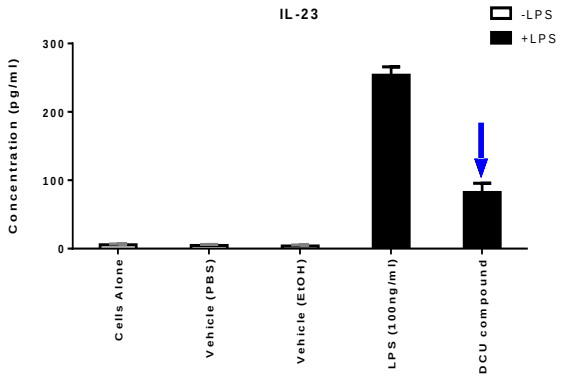
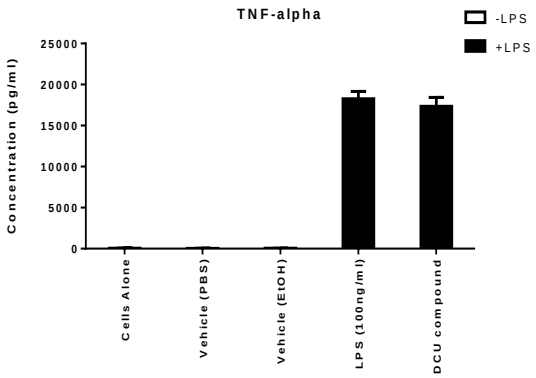
Example Data

In vitro analysis: Bone marrow dendritic cells were conditioned with the novel DCU marine compound for one hour prior to stimulation of lipopolysaccharide (LPS). LPS is found on the cell wall of certain bacteria (gram negative) and stimulates an immunogenic response. After 24 hours, the supernatants were removed and analysed for cytokine levels of IL-12p40, IL-12p70, IL-23 and TNF-alpha using specific immunoassays. The results clearly show that the marine compound has the ability to suppress the pro-inflammatory cytokines IL-12p40, IL-12p70 and IL-23. However, it does not effect TNF-alpha which demonstrates the specificity of this novel DCU compound.

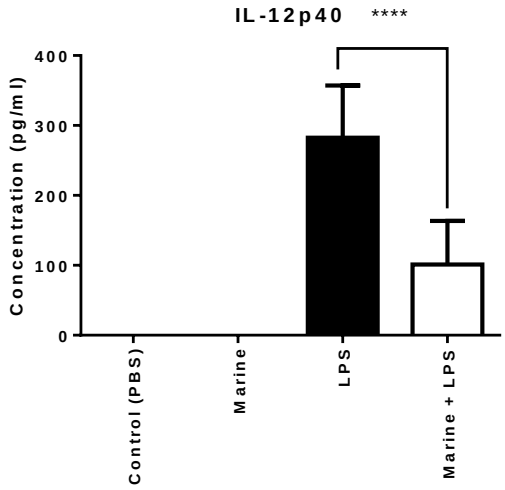


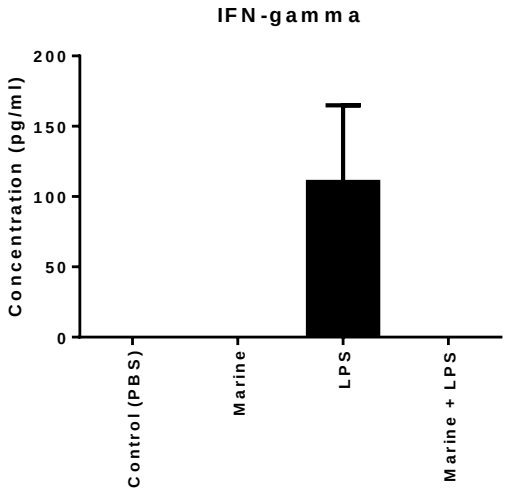






In vivo Analysis: An *in vivo* study (LPS Shock Model) was performed on BALB/c female mice which were aged 17-19 weeks. The mice were divided into four groups: (1) mice administered PBS (control) via IP injection, (2) mice administered marine DCU compound (Marine) via IP injection, (3) mice administered LPS via IV injection and (4) mice administered marine DCU compound via IP injection two hours before LPS IV injection. Six hours after LPS injection, each of the mice were culled and serum was collected to measure cytokine levels (IL-12p40, INF-gamma, IL-1β) by ELISA It was shown that the marine DCU compound suppressed the pro-inflammatory cytokines therefore exhibiting an anti-inflammatory effect.





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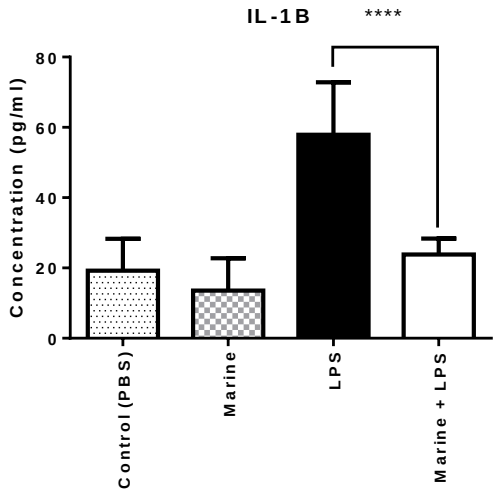

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