

## 4<sup>th</sup> World Congress on TRANSPLANT

February 22-23, 2022 Webinar

Journal of Vascular and Endovascular Therapy ISSN: 2634-7156

# Targeting inflammation in dry eye disease-novel microRNAs as potential therapeutics

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An ability to effectively modulate miR function and thus ocular inflammation has wide ranging therapeutic and commercial implications for a variety of conditions where individuals suffer from DED including age-related DED, pSS, SS secondary to rheumatoid arthritis and SLE, viral keratitis etc. Initial analysis demonstrated that altered expression of miR-21 and miR-155 in peripheral immune cells from SS patients results in the observed increased proinflammatory cytokine production seen in these individuals. These studies also identified novel miRs that are differentially expressed in peripheral immune cells that distinguish between patients with low or severe systemic disease activity, which could aid in patient stratification and targeted therapeutics.

Additionally we have identified a novel miR, miR-744, whose expression is significantly increased in conjunctival epithelial cells from pSS patients compared to healthy controls. This overexpression results in significantly reduced expression of Pellino3 a known negative regulator of type I IFN production. Controlled and sustained delivery of ophthalmic drugs continues to remain a major focus area in the field of pharmaceutical drug delivery. As such we next formulated and characterised suitable non-immunogenic particles to deliver miR modulating compounds to ocular surface. Treatment of primary human conjunctival epithelial cells (CEC) with our optimised nanocarrier resulted in decreased miR-744 expression and increased Pellino3 expression. MTT toxicity assay demonstrated that the particles were well tolerated by CEC

compared to standard transfection reagents. Our studies indicate that nanomedicines represent an idealised strategy for effective and targeted delivery of miR modulating agents to the ocular surface.

#### Biography

Dr Joan Ní Gabhann-Dromgoole, Lecturer in Ophthalmology and Immunology, Ocular immunology Research Group (OIRG), School of Pharmacy & Biomolecular Sciences in the Royal College of Surgeons in Ireland. The Ocular immunology Research Group (OIRG) currently focuses on the autoimmune condition Sjögren's syndrome (SS), which is a systemic autoimmune disorder characterized by severe dry eyes and dry mouth SS is most common between the ages of 40 and 60, with women 9 times more likely to suffer from SS than men. Chronic inflammation, accompanied by increased lymphocytic infiltration of exocrine glands, is the pathological hallmark of this disease.

There are currently no effective therapies for SS or diagnostic tests that allow identification of patients who will go on to develop further complications. The OIRG have determined differentially expressed microRNAs in SS patients and suggest targeting these microRNAs may have therapeutic potential.

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### Received: February 19, 2022; Accepted: February 22, 2022; Published: February 26, 2022

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