

CYTOKINE THERAPY FOR JUVENILE DERMATOMYOSITIS AND OTHER AUTOIMMUNE DISEASES

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Technology Description

Researchers in Prof. Anthony French's laboratory have discovered a signaling mechanism associated with juvenile dermatomyositis (JDM) that could potentially be targeted with cytokine-based therapies to treat JDM as well as other autoimmune disorders. This therapeutic approach is based on the finding that changes in signaling from phospholipase C gamma-2 (PLC γ 2) can lead to functional defects in natural killer (NK) cells in patients with JDM. Correcting these functional defects in the NK cells could present an opportunity to treat autoimmune diseases more broadly because NK cells help protect against autoimmunity by killing abnormally activated cells. Further studies by the inventors revealed evidence that cytokines (such as IL-2 and IL-15) can mitigate the underlying PLC γ 2 signaling abnormalities. This finding could be used to develop therapies for JDM, adult dermatomyositis or other autoimmune diseases such as lupus or multiple sclerosis.

Stage of Research

Preclinical target validation: Using mass cytometry (CyTOF) analysis, the inventors demonstrated that PLC γ 2 is hypophosphorylated in the immune cells of patients with JDM who have not been treated. Furthermore, this hypophosphorylation is reversed upon successful treatment. In addition, the inventors have delineated the mechanism that leads to functional defects natural killer (NK) cells and found evidence that cytokines can reverse the effects of hypophosphorylated PLC γ 2.

Applications

- **Therapeutic for autoimmune disease** – juvenile dermatomyositis (JDM), adult dermatomyositis, multiple sclerosis, lupus, rheumatoid arthritis

Key Advantages

- **Unmet medical need** – current treatments for JDM are not effective for all patients and the disease and it continue to inflict significant morbidity

Publications

- Throm, A. A., Alinger, J. B., Pingel, J. T., Daugherty, A. L., Pachman, L. M., & French, A. R. (2018). [Dysregulated NK cell PLC \$\gamma\$ 2 signaling and activity in juvenile dermatomyositis](#). *JCI insight*, 3(22).

Patents

- Provisional patent application filed

Website

- [Anthony French Faculty Profile](#)
- [French Lab](#)