



STEMIA

2025-2026

LOGBOOK



ALTERNATIVE TARGETED
TREATMENT FOR
LICHEN PLANUS

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October 5th, 2025

I began researching possible topics related to auto-immune diseases. I was interested in conditions where the immune system attacks itself.

October 12th, 2025

After reading several articles, I chose "Lichen Planus" to be my main focus, since there are only short term cures and general immunosuppressants.

October 20th, 2025

I started looking into the immune mechanisms involved in Lichen Planus, and learned that T-cells are the major damaging cells.

October 28th, 2025

A study stated that inflammatory signaling pathways are significant for the inflaming lesions. I wonder if these pathways can be targeted more precisely.

November 9th, 2025

I began focused research on the immune reactions involved. Last month, I found the T-cell to be the main cell that damages mucous cells. Immune cells like T-cells release proteins or "cytokines", called IL-17 and TNF-alpha. This helped me better understand that the lesions come from the immune cell attacking itself rather than an infection.

November 21st, 2025

In an article by the National Library of Medicine on the "Use of Jak Inhibitors in Lichen Planus", it is stated that a Jak-STAT signaling pathway transmits inflammatory signals through cytokines to manage immune responses. These signals if interpreted wrong could lead to other autoimmune diseases, such as rheumatoid arthritis. But in this type of arthritis, the joint is attacked rather than the mucous and skin cells.

December 3rd, 2025

I compared various targeted treatments like monoclonal antibodies that block cytokines and molecule drugs that slow the flow of the other cytokines in the JAK-STAT pathway. Doing this helped me distinguish the difference in extracellular and intra-cellular target treatments.

December 10th, 2025

After I organized the main pathways in Lichen Planus and identified the IL-17 and the JAK-STAT pathways as targets for future research. I thought about selective treatment on the more powerful immune mechanism.

December 17th, 2025

I made a simple rough drawing for how cytokines activate immune cells and how the JAK-STAT pathway carries signals inside the cell. If I have extra time, I want to make a 3D model so the judges can grasp a better understanding.

December 29th, 2025

Something I learned today was that autoimmune diseases can vary between patients. This idea leads me to think that a more personalized treatment strategy would be more powerful than the same treatment for everyone.

January 7th, 2026

I have made my main concept. It is a two sided treatment approach that could target cytokines like IL-17 when the inflammation is due to the cytokines, and use a JAK-STAT inhibitor when the intracellular signals are more powerful, depending on the patient.

January 11th, 2026

To be more specific in my main concept, I wanted to add how the cytokines would be targeted. For IL-17, a monoclonal antibody would be designed with an antigen-antibody to be binded with IL-17. For the JAK inhibitor, an oral or topical that would block enzyme activity. This reduces the inflaming lesions and prevents further STAT protein activation.

January 20, 2026

Hiboy

February 8th, 2026

I prepared for the STEMIAS science fair by finalizing my CYSF platform finished sections. I focused on explaining the role of the protein pathways, and why pathway-specific treatment is more important and powerful than traditional treatments.