Fully Human Anti-IL-17A Nanobody for the Treatment of Psoriasis

Overview

Drug Name	VVH-P001
Description	VVH-P001 is a fully human single-domain antibody (VHH) targeting IL-17A for the treatment of moderate-to-severe plaque psoriasis via transdermal delivery. VVH-P001 is being developed to improve efficacy, safety, and patient compliance by offering a non-invasive, self-administered alternative to injections, potentially reducing systemic side effects associated with current biologics.
Target	IL-17A
Drug Modality	VHH antibody
Indication	Psoriasis
Product Category	Immunotherapy
Mechanism of Action	Neutralization of IL-17A, a key cytokine involved in psoriasis pathogenesis, thereby reducing inflammation, keratinocyte hyperproliferation, and skin lesions.
Status	Discovery
Patent	Pending

Collaboration Opportunity

Protheragen Inc. is actively seeking partnership for VVH-P001. Potential collaboration can be strategic alliance, licensing, or marketing agreement.
We look forward to hearing from you.

Target

Interleukin-17A (IL-17A)

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Introduction	IL-17A is a pro-inflammatory cytokine central to the pathogenesis of psoriasis. It promotes keratinocyte proliferation, inflammation, and the formation of psoriatic plaques. Targeting IL-17A has proven clinically effective in treating psoriasis.
Approved Name	Interleukin 17A
Official Symbol	IL17A
Gene Type	Gene with protein product
Synonyms	Interleukin 17; cytotoxic T-lymphocyte-associated serine esterase 8
Ensembl	ENSG00000112115
Gene ID	3605
mRNA Refseq	NM_002190.3
Protein Refseq	NP_002181.1
OMIM	603149
UniProt ID	Q16552
Chromosome Location	6p12.2

Clinical Resources

Gene Function	IL-17 is a family of cytokines whose members include IL-17A, IL-17B, IL-17C, IL-17D, IL-17E, and IL-17F. IL-17A and IL-17F exhibit the highest structural homology within the IL-17 cytokine family, and therefore have very similar biological functions. Many studies have confirmed that psoriatic skin is characterized by high expression of IL-17A and IL-17F. IL-17A is a key cornerstone cytokine involved in the development of psoriasis, acting on both immune and non-immune cell types and strongly promoting tissue inflammation.
Pathway	IL-17A/IL-17RA pathway
Major Conditions	Plaque psoriasis; Axial spondyloarthritis; Hidradenitis suppurativa

Drug Modality

Single-domain Antibody (VHH)

This project differentiates itself through the transdermal delivery of VHH. VHHs are smaller and more stable than traditional monoclonal antibodies, offering the potential for better skin penetration and localized action.

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Transdermal delivery overcomes the stratum corneum barrier to deliver the therapeutic VVHs directly to the affected skin, minimizing systemic exposure while maximizing efficacy by targeting IL-17A. Compared to traditional biologics administered via injection, VHHs delivered transdermally offer several advantages: improved patient convenience and compliance, reduced potential side effects, and potentially lower manufacturing costs.

Indication

Psoriasis

Disease Background: Psoriasis is a chronic, autoimmune, inflammatory skin disease affecting approximately 2-3% of the global population. Persistent dysregulation of the cutaneous immune system results in the development and recurrence of scaling, nonhealing skin lesions. It's generally accepted that interactions between innate and adaptive immune system components, such as dendritic cells and T cells, along with resident cutaneous cells, are involved in the pathogenesis of psoriasis. Lesions commonly appear on the scalp, knees, elbows, and torso, but can also affect nails, palms, soles, genitals, and face. The scaling of psoriatic plaques is due to abnormal terminal differentiation of keratinocytes, disrupting the protective barrier of the skin.
Unmet Medical Need: Current treatments for psoriasis, including topical agents and systemic biologics, have limitations. Topical agents may be insufficient for moderate to severe cases, while biologics require injections, which can lead to poor patient compliance. There is a need for a more convenient, effective, and safe treatment option.
Market Opportunities: Psoriasis is a chronic condition requiring ongoing treatment, with significant costs both direct (USD 51.7-63.2 billion) and indirect (USD 23.9-35.4 billion). The total annual cost in the U.S. was estimated at USD 112 billion in 2013. The cost of psoriasis treatment is rising faster than inflation. From 2000 to 2008, the price of branded therapies increased by 66%. The cost of psoriasis treatment is rising faster than inflation. From 2000 to 2008, the price of branded therapies increased by 66%. The global market for psoriasis drugs was USD 34 billion in 2023, with U.S. sales making up 78%. The market for psoriasis drugs is expected to reach USD 58-67 billion by 2030. A novel transdermal delivery of VHH has the potential to capture a significant share of this market.

Mechanism of Action

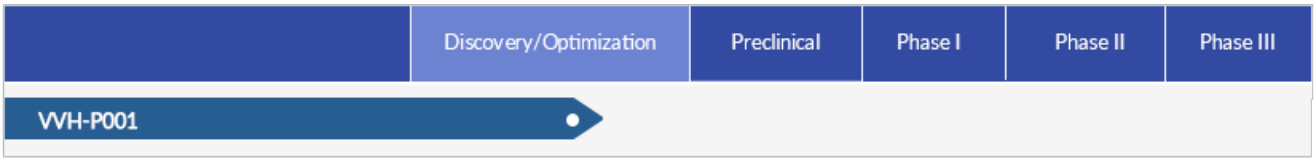
Neutralization of IL-17A

IL-17A is a homodimeric cytokine that binds to the IL-17 receptor complex present on various cell types, including keratinocytes, endothelial cells, and immune cells. Binding of IL-17A to its receptor activates downstream signaling pathways such as NF-κB and MAPKs, leading to the expression of pro-inflammatory genes, recruitment of immune cells, and perpetuation of the inflammatory cascade inherent in psoriasis. VVH-P001 is a nanobody targeting IL-17A functions by specifically binding to IL-17A with high affinity, effectively neutralizing its biological activity. Due to the small size, high stability, and ease of genetic manipulation and production, VVH-P001 has better tissue penetration and the ability to bind to hidden or cryptic epitopes than traditional monoclonal antibodies.

Status

The Status of VVH-P001

VVH-P001 is in early development, and is open to various partnership models such as co-development, licensing, and NewCo.



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