Psoriasis Drug Pipeline Glossary of Terms

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To understand terms in the **drug pipeline**, a basic knowledge of the inflammation and immune actions that lead to psoriasis symptoms is helpful. Psoriatic skin and joint symptoms result when the body starts its protective responses that increase the number of immune cells and inflammatory molecules. These responses are directed at the body's own skin, resulting in inflammation and formation of psoriatic plaques. New drugs to treat psoriasis try to control the resulting inflammatory and overly active immune reactions.

This gloassary explains terms you'll find in the pipeline's "mechanism of action." These terms identify pathways affected by the pipeline's drugs and their targets in the body. Learn more about **terms that describe the science of psoriasis and psoriatic arthritis**. More details are available by searching the National Institutes of Health **immune system glossary**.

Read more about:

Anti-Inflammatory Drugs » **Immune Suppressant Drugs »** **Skin Cell Inhibitors »** **Proprietary Drugs »**

Anti-Inflammatory Drugs

These drugs inhibit molecules that cause inflammation. They can target single molecules or a specific interleukin (see entry below). They can also target multiple steps in the inflammatory pathway.

Adenosine A3 receptors are surface protein molecules on the outside of cells that connect with the protein adenosine and start inflammation. When A3 receptors are blocked, adenosine cannot signal cells in the skin to become inflamed.

Corticosteroids, or steroids, stop inflammation all over the body, not just in the skin, by lowering the overall body's immune response. Steroids also appear to slow skin growth by reducing the number of new cells in psoriasis skin, and they are particularly useful at stopping itching and swelling.

Fumaric acid is a small-molecule drug that lowers the number of T cells in the skin and it appears to stop special cells called natural killer cells from starting inflammation in the skin.

Inflammation is the normal and protective way our bodies react to stresses, such as infections, allergy or injury. As part of the body's defense, inflammation increases blood flow to the area. In diseases such as psoriasis, inflammation causes five key symptoms: redness, warmth, swelling, pain and itch.

Inflammatory molecules are released by cells when the body is stressed. They initiate the symptoms of inflammation in one body area or throughout the body. Each molecule works at a different step of the inflammatory path. Some examples are cytokines, prostaglandins and kinases.

Interleukins (ILs) are proteins that turn on inflammation by increasing the number of immune system cells that respond to a stress on the body. Particular interleukins, such as IL-12, IL-17 and IL-23, cause psoriatic skin symptoms to worsen. **Interleukin inhibitors** stop inflammation by blocking the action of individual interleukins that are linked to psoriasis progression.

Kinases are special enzyme proteins made in cells especially when the body is stressed. Kinases turn on inflammatory pathways in different tissues for various diseases. In psoriasis, the skin gets thicker and redder and develops scales. Some kinases connected with psoriasis include Janus kinase (JAK), MEK, protein C and p30 MAP. **Kinase inhibitors** each block one specific type of inflammatory kinase to ease psoriasis skin symptoms.

Oxidation is a type of stress on cells and tissues. In healthy cells, oxygen molecules partner with other molecules to maintain normal cell actions. When these molecule pairs break, sometimes as a result of cell damage from injury or infection, the unpaired oxygen can enter other cells and trigger an inflammatory response. Phospholipids, fat-like substances found throughout the body, can become attached to unpaired oxygen. These **oxidative phospholipids** carry the damaging oxygen molecules into tissues like the skin to start inflammation symptoms.

Phosphodiesterase 4 (PDE4) is a protein in immune cells that starts inflammatory actions by lowering the level of a useful cell communication substance called cAMP and by increasing cell chemicals that start inflammation. **PDE4 inhibitors** stop PDE4 from blocking cAMP and from turning on cytokine messengers of inflammation. As a result, PDE4 inhibitors stop inflammation from beginning in the cell.

Sirtuin activators increase the amount of sirtuin made in skin cells. Sirtuin is a protein in skin cells that protects the cells from damaging oxidation or inflammatory stress. When sirtuin levels in cells are high, psoriatic skin symptoms lessen.

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Immune Suppressant Drugs

These drugs stop the body's immune T cell activity or block immune chemicals released from T cells that trigger inflammation and extra skin cell production. In psoriasis, immune suppressants reduce skin buildup and skin redness.

Biologics are a class of protein agents that target a specific pathway in the immune system and reduce inflammation(see "immunomodulator" below). In psoriasis, biologics help slow immune system cells and their interactions that promote inflammation and overproduction of skin cells.

Calcineurin is a protein released from T cells that causes swelling and extra skin cell formation. In psoriasis, this results in thick layers plaques, and symptoms of inflammation. **Calcineurin inhibitors** stop T cells from releasing calcineurin, so inflammatory swelling and redness stop. Two calcineurin inhibitors, tacrolimus and pimecrolimus, are approved for atopic dermatitis and might help reduce plaques of extra skin cells in psoriasis. CD4 T cells, or T cells, are immune system cells that protect the body by killing invaders and by releasing chemicals that heal injuries. In psoriasis, immune cells gather in the skin and joints to increase skin cell production and inflammation.

CD4 T cell Inhibitors directly stop the body from building an immune attack. In psoriasis, these drugs lower the number of new CD4 T cells made and active in the skin. Fewer T cells in the skin results in lower inflammation and skin symptoms.

Cytokines are proteins that act as messengers in and between cells. Some cytokines are released from immune T cells and turn on inflammation. In psoriasis, tumor necrosis factor-alpha (TNF-alpha) is a cytokine that fuels inflammation and immune responses in the skin. Cytokine-blocking drugs are often immune suppressant drugs that work against TNF (anti-TNF agents) or similar molecules found in immune cells.

Immune response describes changes the body makes to protect itself and maintain health. An immune response sends existing and new T cells to stressed body areas; the response increases chemicals released from T cells that turn on inflammation as well. In psoriasis, the immune response chemicals increase the speed of new skin cell growth, resulting in extra layers of thickened skin, or plaques.

Immune substances are molecules, such as cytokines, released from immune T cells to turn on the body's defense and inflammation systems. In psoriasis, immune substances turn on a skin cell attack that leads to redness, swelling and skin cell overproduction.

Immunomodulator is a general term for a drug that changes how the immune system acts in the body, either by increasing or decreasing immune cell activity. For immune diseases like psoriasis, immunomodulators frequently suppress or slow T-cell activity.

Sphingosin-1-phosphate (S1P) is a fatty molecule released from different types of cells to start inflammation and new cell formation when it binds with S1P receptors on tissue cells. S1P increases levels of immune T cells in different areas of the body.

Sphingosin-1-phosphate-1 (S1P1) receptor agonists are immunomodulatory drugs that can act like S1P. When an S1P1 receptor agonist is added to the blood, it tells the body not to send immune cells from

the blood into tissues like the skin. By keeping T cells in the blood and away from the skin, S1P1 receptor agonists stop immune chemicals from increasing skin cell growth and inflammation.

Tumor necrosis factor (TNF) blockers stop the formation and release of the protein TNF-alpha from immune T cells. TNF-alpha is an immune cell protein that starts inflammatory damage in many diseases. People with skin and joint symptoms of psoriatic disease have higher than normal levels of TNF-alpha.

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Skin Cell Inhibitors

These drugs work directly at the skin to stop new skin cells from being made by the body, so plaques become thinner and cell turnover becomes slower and more normal. Some skin cell inhibitors also help loosen old skin cells to lessen scale and smooth the skin.

Analogs, or **derivatives**, are terms that describe synthetic, or manmade, drug products that are related to substances naturally found in the body, in plants or in foods. For example, some drugs are chemically stable derivatives of vitamins that help keep the body healthy.

Anthralin is a skin irritant used on psoriasis plaques alone or with ultraviolet light to stop abnormal skin cell reproduction and to reduce the number of skin cells. It also removes old skin cells so that skin becomes smoother.

Calcipotriene is a synthetic version of vitamin D that slows growth and buildup of extra skin cells. In psoriasis, rapid skin buildup characterizes plaques and vitamin D helps remove the scales, thins and flattens the skin, and stops extra skin cells from being made.

Integrin inhibitors block integrin, a receptor found on the outside of many types of cells. In psoriasis, integrin receptors on skin cells help connect cells together and build new skin layers. Blocking integrin stops or greatly slows new psoriasis skin growth.

Retinoids are synthetic versions of vitamin A, important for proper skin cell health and functioning. Vitamin A helps skin cells maintain normal activity and renewal. In psoriasis, retinoids help balance skin cell production to lessen thickness and flakiness from excess skin formation. They might reduce inflammation as well.

Rose bengal is a dye is commonly used for medical tests, especially eye tests. Because it can destroy selected cells that it enters, rose bengal might be useful in psoriasis to kill extra skin cells in plaques but not in normal skin.

Trk kinase or troponin-related kinase, is a protein that helps tell the body to make more skin cells. Skin with Trk is much thicker, as cell growth speeds up and skin cell quantities increase. A particular subtype,

TrkA, is found in only one layer of normal skin but is found in all epidermal layers of psoriatic skin. **Trk inhibitors** stop Trk from encouraging new cell formation and might reduce the thickness of skin plaques.

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Proprietary

This term represents information not yet shared with the public. Proprietary knowledge remains private to the manufacturer or research group until more studies are completed. Pipeline drugs in early stages of testing may be listed as proprietary until the manufacturer learns and releases new information about how or where the drug works in the body.