WHAT IS PSORIASIS?
Psoriasis is a type of autoimmune disease, which means that the immune system overreacts and attacks the body instead of protecting it. Normally, skin cells take a full month to grow and fall off. Psoriasis patients’ immune systems make their skin cells grow in 3-4 days, but instead of falling off, they pile up on the surface of the skin.

SYMPTOMS OF PSORIASIS
Common symptoms of psoriasis include:
- Red or dark brown scaly patches on the skin
- Dry, cracked skin that may bleed
- Itching or burning sensations
- Thickened, ridged, or pitted nails

TYPES OF PSORIASIS
There are several different types of psoriasis, including plaque psoriasis, inverse psoriasis, guttate psoriasis, and pustular psoriasis. All forms of psoriasis are long-term (chronic) conditions and have no cure, but they can be managed with medication.

PLAQUE PSORIASIS: This is the most common form of psoriasis. With plaque psoriasis, skin cells build up and cause itchy and scaly patches called plaques. Plaques can appear anywhere but commonly affect the knees, elbows, trunk, and scalp. For patients of color, plaques are often patches of dark skin with purple or grayish scales; white patients usually have plaques with scales that look silvery-white.

INVERSE PSORIASIS: This type of psoriasis appears in skin folds like underarms, behind the knees, or the groin. On patients of color, it appears as dark brown or purple patches. On white patients, it appears as red patches. Unlike plaque psoriasis, it’s typically not scaly. Inverse psoriasis is present in 21-30% of people with psoriasis. It can appear at the same time as other forms.

GUTTATE PSORIASIS: This causes lots of small raised red bumps on the skin. These bumps are called papules. About 8% of people with psoriasis will develop guttate psoriasis. It is more common in children and young adults. Guttate psoriasis often occurs suddenly and can be triggered by an infection like strep throat.

PUSTULAR PSORIASIS: This causes painful bumps on the skin that are filled with yellow or white pus. The pus is not harmful to other people. About 3% of people with psoriasis will develop pustular psoriasis. It is more common in older adults.

PSORIATIC ARTHRITIS: Psoriatic arthritis is not a type of psoriasis, but 1 in 3 people with psoriasis will develop psoriatic arthritis. It usually develops about 10 years after the first symptoms of psoriasis. It is a joint condition that causes swelling, stiffness, and pain in the joints. Symptoms include fatigue, tendon pain, joint stiffness, and swollen fingers and toes.

UNDER THE MICROSCOPE
This high-power view of the skin from a patient with psoriasis shows the thickening of the epidermis (the outermost layer of skin - blue arrow) with a thickened layer of sloughing skin cells (stratum corneum) on the very top of the image called “parakeratosis” (green arrow). Inflammatory cells are present in the deeper layer of the skin (dermis), the epidermis, and the stratum corneum.
LABORATORY TESTS RELATED TO DIAGNOSING PSORIASIS

There are no blood tests that can diagnose psoriasis. However, after performing a physical examination, a doctor may order a biopsy to confirm a psoriasis diagnosis. During this procedure, a doctor removes a small piece of affected skin and sends it to the laboratory, where a pathologist will look at it under a microscope.

TESTS RELATED TO MANAGING PSORIASIS

*Reference ranges are set by individual laboratories for their specific populations, so reference ranges might differ slightly.

Psoriasis treatment is highly individualized and ranges widely from patient to patient. Treatment can include medicated skin creams, light therapy, pills, and injections. Many psoriasis medications, especially pills, and injections, work by suppressing the immune system. These medications can put patients at higher risk of infection and can negatively affect organ function. Patients and their doctors use lab tests to make sure that the treatment is effective.

**COMPLETE BLOOD COUNT (CBC):** This test determines your overall health status by looking at your overall blood count levels, including your red and white blood cell counts and your platelets. This test helps monitor infection and inflammation in psoriasis patients.

**TYPICAL REFERENCE RANGES FOR MEN***:

<table>
<thead>
<tr>
<th>Complete Blood Count</th>
<th>Role in Health</th>
<th>Typical Reference Range*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematocrit</td>
<td>Percentage of Red Blood Cells in the Blood</td>
<td>38.3-48.6%</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>Oxygen-Carrying Protein</td>
<td>13.2-16.6 grams/dL</td>
</tr>
<tr>
<td>Platelet Count</td>
<td>Blood Clotting</td>
<td>135-317 x 10^3 /µL</td>
</tr>
<tr>
<td>Red Blood Cell Count</td>
<td>Carry Oxygen</td>
<td>Between 4.35-5.65 x 10^6 /µL</td>
</tr>
<tr>
<td>White Blood Cell Count</td>
<td>Fight Infections</td>
<td>3400-9600 cells/µL</td>
</tr>
</tbody>
</table>

**TYPICAL REFERENCE RANGES FOR WOMEN***:

<table>
<thead>
<tr>
<th>Complete Blood Count</th>
<th>Role in Health</th>
<th>Typical Reference Range*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematocrit</td>
<td>Percentage of Red Blood Cells in the Blood</td>
<td>35.5-44.9%</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>Oxygen-Carrying Protein</td>
<td>11.6-15 grams/dL</td>
</tr>
<tr>
<td>Platelet Count</td>
<td>Blood Clotting</td>
<td>157-371 x 10^3 /µL</td>
</tr>
<tr>
<td>Red Blood Cell Count</td>
<td>Carry Oxygen</td>
<td>Between 3.92-5.13 x 10^6 /µL</td>
</tr>
<tr>
<td>White Blood Cell Count</td>
<td>Fight Infections</td>
<td>3400-9600 cells/µL</td>
</tr>
</tbody>
</table>

**LIVER FUNCTION TESTS (LFTS):** Psoriasis medications sometimes negatively affect the liver. The liver creates enzymes, which are chemicals that help the body break down protein. Liver function tests (also called a liver panel) usually measure the following:

- **Total Protein:** This test measures the amount of albumin and globulins, which are both proteins, in the blood. A total protein test is utilized during a patient’s regular health checkup. It can also be used if a person is experiencing unexplained weight loss, tiredness, or any related liver or kidney disease symptoms. This test is important because albumin and other proteins in the blood may decrease with severe liver disease; therefore, this test will help indicate whether or not there is liver disease. Typical reference ranges for adults are between 6.0-7.8 g/dL.

- **Bilirubin:** This test measures the amount of bilirubin in the blood, a waste product produced by the breakdown of heme, a component of hemoglobin found in red blood cells. The liver processes bilirubin to remove it from the body. This test is important because levels of bilirubin assess a person’s liver function. Typical reference ranges are 0.1-1.2 mg/dL.

- **Prothrombin Time (PT):** This test is used to assess whether an individual can form blood clots correctly. The test can calculate the number of seconds it takes for a clot to form in the blood once specific reagents are added. The PT test is usually used along with a partial thromboplastin time test (PTT). Combined, these tests help determine the function of coagulation factors. This test is important because it helps determine if the liver is correctly making the blood coagulation factors produced mainly by the liver; a prolonged PT may indicate the severity of liver damage. Typical reference ranges for adults are 10 to 13 seconds.

- **Partial Thromboplastin Time (PTT):** This test is used to help evaluate a person’s ability to form blood clots. It measures how many seconds it takes for a person to form a clot. This test is important because when the blood vessel or walls are injured, a process called the coagulation cascade begins to stop bleeding; this test measures how long it takes for the bleeding to stop. Typical coagulation time for adults is between 25-40 seconds.

- **Alkaline Phosphatase (ALP):** This test measures the ALP in your blood, an enzyme found in several tissues throughout the body, mainly in the liver and bones. This test is important because elevated ALP levels are commonly present in liver disease, bile obstruction, gallbladder disease, or bone disorders. Typical reference ranges for adults are between 50-70 mg/dL.

- **Alanine Aminotransferase (ALT):** This test measures the amount of ALT in your blood, an enzyme found mainly in the liver and kidney cells. This test is important because high levels of ALT may indicate liver disease. Typical reference ranges for adults are between 8-20 U/L.
**Aspartate Aminotransferase (AST):** This test measures AST levels in your blood, an enzyme found throughout the body, specifically in the heart and the liver. When liver cells are injured, they release this enzyme, making this a helpful test for identifying liver damage. Typical reference ranges for adults are between 8-20 U/L.

**Gamma-Glutamyl Transpeptidase (GGT):** This test is used to determine the level of the enzyme gamma-glutamyl transferase (GGT) in the blood. The enzyme is usually found in multiple organs but has a high concentration in the liver. This test is important because increased levels of GGT can indicate liver disease. Typical reference ranges for adults are between 9-48 U/L.

**Lactate Dehydrogenase (LDH):** This test is used to determine the amount of lactate dehydrogenase (LDH) in some bodily fluids and the blood. LDH is an enzyme utilized for energy production and is located in many cells throughout the body. The highest levels of LDH are found in the liver, lungs, kidney, blood cells, heart, and muscles. This test is important because when LDH levels are increased, it indicates cell damage throughout the body. Typical reference ranges for adults are between 105-333 IU/L.

**Blood Urea Nitrogen (BUN):** This test measures the amount of nitrogen in the blood that comes from urea, a waste product made by the liver. High levels can mean that the kidneys are not filtering blood correctly. A typical reference range for adults is between 7-20 mg/dL, though the ranges can vary based on your age.

**Serum creatinine:** This test measures the amount of creatinine in the blood. Creatinine is a waste product created by normal muscle function. High levels of creatinine can mean that the kidneys are not filtering blood correctly. A typical reference range for adults is between 0.84 and 1.21 mg/dL. Please note that the reference range for creatinine depends on a person’s age, sex, body, muscle mass, etc.

**Estimated Glomerular Filtration Rate (eGFR):** This is a calculation that estimates how well the kidneys are filtering waste products out of the blood. The calculation usually combines the patient’s age, gender, size, and creatinine levels to check how quickly the kidneys work. A typical reference range for adults is between 90-120 mL/min/1.73m2.

Kidney function is also monitored via urine tests. In a 24-hour urine test, a patient collects urine (pee) in a special container over 24 hours. The container is given to the lab, where the lab professionals will usually perform the following:

**Urinalysis:** This test looks at the number of red blood cells, white blood cells, bacteria, blood, crystals (which can become kidney stones), acidity, protein, glucose, and bilirubin in the urine. Results outside of the normal range can signal that the kidneys are not working correctly.

**Microalbuminuria:** This test measures the presence of small amounts (hence, “micro”) of albumin in the urine, which is a protein found in blood serum. Albumin is the main protein of blood plasma and it helps bind other minerals and hormones. When kidneys start to fail, a small amount of albumin begins to leak into the urine which this test can detect. A typical reference range* for adults is less than 30 mg. The ratio of this protein to creatinine in urine is used by your doctor to understand your kidney function.

**TUBERCULOSIS (TB) SCREENING:** Medication for psoriasis suppresses the body's immune system, which makes it easier for patients to develop TB, so patients may need to undergo screening tests. TB tests include:

**Mantoux Tuberculin Skin Test (TST):** This test is used to check whether a person has been infected with TB. A small needle is used to inject a liquid called tuberculin under the skin of the forearm. The injection causes a small, pale bump to appear under the skin. The size of the swollen portion of this bump is called induration. After 48-72 hours (about 3 days), a health care professional examines the bump and measures the diameter of induration. They combine this measurement with a patient’s known risk for TB for the final test result. The cut-off for a positive test is lower for people with a higher risk of TB. The TST cannot tell the difference between active infection and latent TB.

**Interferon-Gamma Release Assays (IGRAs):** This test is used to check whether a person has been infected with TB. This blood test measures the immune reaction to Mycobacterium tuberculosis. This test is important because if the person is infected with M. tuberculosis, interferon-gamma is released when mixed with antigens. A positive TB blood result means that TB bacteria are present in the blood, but it does not tell if it is an active infection or latent TB.

**Chest Radiograph:** If a person has a positive reaction to a TST or IGRAs, their doctor will use a chest x-ray to examine the lungs and see if there are any abnormalities or signs of previous TB infection. If there are no abnormalities, then the patient likely has latent TB. If there are signs of previous infection, the patient likely has latent TB but is at risk of developing secondary TB. If there are new abnormalities, the patient may have active TB. Chest X-rays cannot be used to definitively diagnose TB.
About a decade after he developed vitiligo, an autoimmune condition that causes the skin to lose pigment, Rex started showing signs of psoriasis. People with vitiligo often develop additional autoimmune conditions like psoriasis, so his medical team was ready to begin treatment. Psoriasis treatment is highly individualized, so Rex had to try many different medications to find one that successfully controlled his psoriasis. Many psoriasis medications work by suppressing the immune system, which puts patients at a higher risk of infection. They also can negatively affect organ function. To monitor the effects of his medications, Rex gets routine blood tests to confirm everything is working correctly.

As a laboratory professional, Rex has always been proud of the work done by the lab, but being a patient has given him a unique perspective on the lab, “I have a greater appreciation of the service my colleagues do for our patients and the communities we serve. The lab results we provide save lives and I am proud that we make a difference.”

MEET REX

“The lab guides me and lets me know if I am on the right track for my treatment. Lab tests provide general information about our organs and body systems and give me an assurance that, internally, I’m okay.”

ASK YOUR DOCTOR

- What are the signs and symptoms I should look out for?
- Are there additional tests that could be used to understand my disease and prognosis better?
- What are the markers we are monitoring? What are the levels we are looking for? What happens if the markers are outside of the reference range?
- What are my treatment options?
- Why do you recommend this particular treatment option?
- Are there any specific triggers that can make psoriasis symptoms worse?
- Are there lifestyle changes that I should consider?
- Are there any support groups or resources available to help me cope with my diagnosis?

ADDITIONAL RESOURCES

Scan the QR code to view and download our educational resources.

For more information and to get involved: www.ascp.org/patients

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