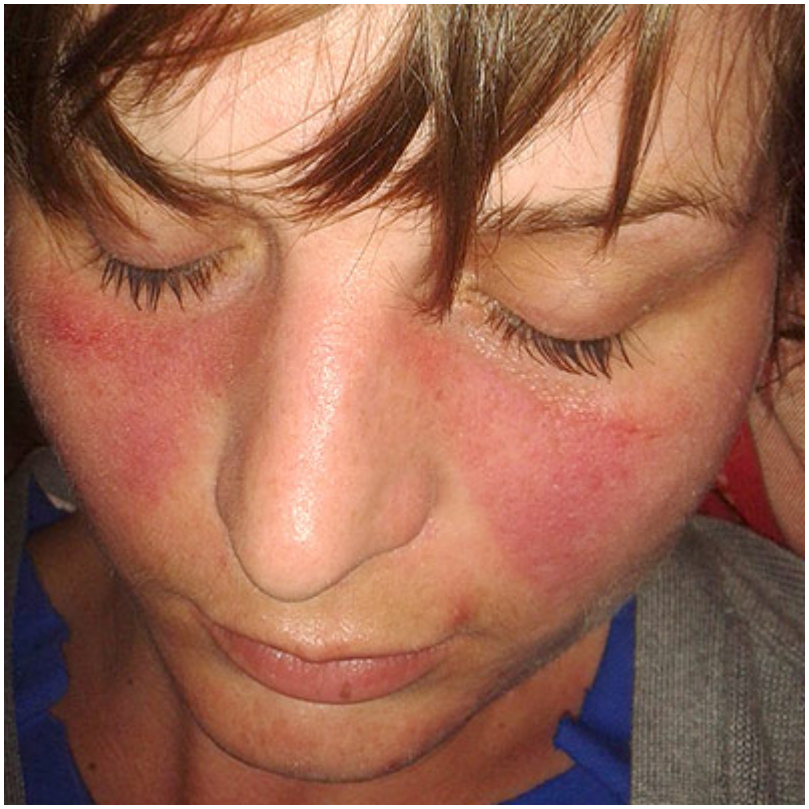
Lupus (Systemic Lupus Erythematosus; SLE) — Diagnosis and Treatment

See online here

The autoimmune disease lupus erythematosus belongs to the collagenosis and signs and symptoms can vary. The symptoms range from mild conditions to severe organ manifestations, which sometimes makes the diagnosis difficult. Review all the important facts about lupus erythematosus here to be prepared for the exam and clinical practice.



Definition of Lupus

The systemic lupus erythematosus as autoimmune disease

Lupus erythematosus belongs to the group of **autoimmune diseases** and further to the group of **collagenoses**. In the group of collagenoses, it is associated with diseases of the rheumatic spectrum disorders.

Epidemiology of Lupus

Women of childbearing age constitute about 90% of the affected patients. Highest prevalence is observed in African-American and Afro-Caribbean women. The overall prevalence of SLE in the US varies from 20 to 150 per 100,000 women.

Etiology of Lupus

Causes of the systemic lupus erythematosus

The exact etiology of lupus is unknown, but there are certain predisposing genetic factors (e.g., the surface molecules **HLA-DR2** and **HLA-DR3**). Furthermore, external factors like hormonal changes, stress, infections, increased light exposure, or drugs can “trigger” lupus.

Pathophysiology of Lupus

The development of systemic lupus erythematosus

The pathological mechanism of lupus is a precipitation of **immune complexes** at the basal membrane of the cell walls. This happens with connective tissue of the skin but also with blood vessels. The precipitations can lead to a **vasculitis,** which can be seen as a so-called **“lupus band”** under the microscope when staining the immune complexes with immunofluorescence stain.

These precipitating immune complexes consist of **DNA**, **antibodies** against this DNA, **complement**, and **fibrin**. They develop due to a misdirected immune response against internal cell nucleus components. These complexes are falsely distinguished as foreign by the immune system and further antibodies are produced.

In summary, genetic and environmental predisposing factors cause increased production of nucleic acids; this in turn elicits an abnormal immune response from the body. The result is the formation of circulating immune complexes. These immune complexes precipitate in the body tissues and cause inflammation and damage.

Clinical Picture of Lupus

Symptoms of systemic lupus erythematosus

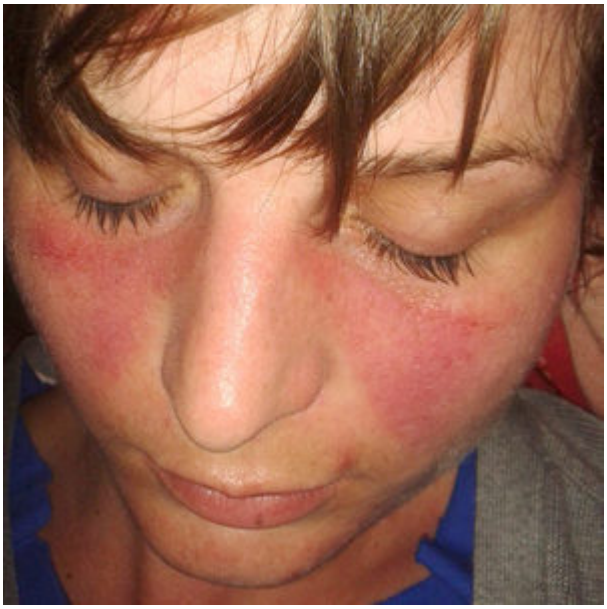


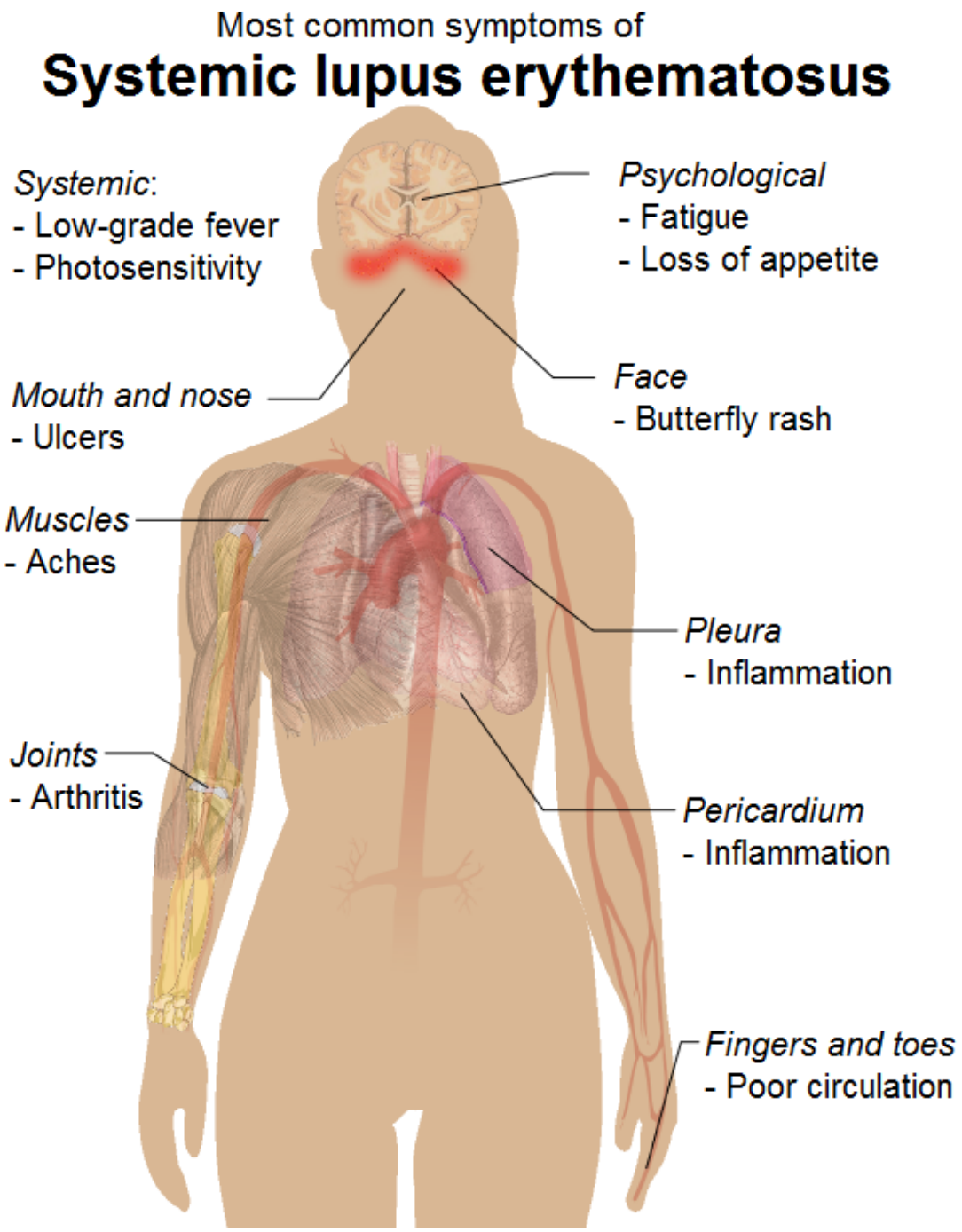
Image: “Butterfly erythema in systemic lupus.” by Doktorinternet – Own work. License: CC BY-SA 4.0

In most cases, systemic lupus erythematosus presents with **nonspecific general symptoms**, which can complicate the diagnosis. Fever, weakness, weight loss, and swelling of lymph nodes are several examples.

Skin changes that give the disease its name manifest nearly as often (lupus = wolf, named after the facial scars similar to a wolf’s bite that stay after healing of the skin defects). The characteristic skin changes are a **butterfly-like erythema** on the cheeks and nasal bridge. Vibrant, scaling papules are found in the subform of discoid lupus.

Furthermore, **polyarthritis** and **myositis** are some of the more common symptoms.

Eventually, SLE can lead to **neurological** symptoms. In these cases, the peripheral nervous system is affected more commonly. Neurological involvement may become apparent due to decreased vigilance, depression, epilepsy, or stroke.



Common signs and symptoms of systemic lupus erythematosus.

Renal changes in systemic lupus erythematosus: The lupus nephritis

The **lupus nephritis,** which occurs in over half of the patients, is crucial for the prognosis of SLE. The complexes of DNA and anti-DNA antibodies lead to the clinical picture of a classic immune complex glomerulonephritis. This condition can express itself with different clinical symptoms ranging from asymptomatic **proteinuria** to **chronic renal failure**.

It is divided into six different types by the World Health Organization (WHO) as well as the International Society of Nephrology and Renal Pathology Society; each type is treated differently. The therapy consists of immunosuppression and an optimal blood pressure

adjustment in most cases; treatment may differ for those with either minimal or extensive involvement of the kidneys.

Summary of the symptoms of systemic lupus erythematosus

All in all, you should think of a systemic lupus erythematosus with the following symptoms:

- Fever, weakness, weight loss
- Butterfly rash
- Polyarthritis, myositis
- Cardiopulmonary changes
- Lupus nephritis
- Neurological changes

Diagnosis of Lupus

Laboratory diagnostics for systemic lupus erythematosus

- The **anti-dsDNA antibodies** that are increased in 70% of the cases of lupus, and the **anti-nuclear antibodies (ANA)** that are nearly always increased, are characteristic. Yet, these antibodies can also be found in healthy individuals in low concentrations.
- Test results for other antibodies can also be positive: anti-Sm, anti-Ro, antiphospholipid antibodies (APA), anti-histone, antineuronal, anti ribosomal, etc. The circulating antibodies often lead to a decrease in certain cell counts, such as **thrombocytopenia** and **lymphocytopenia**.

Note:

- Increase of ANAs in 95% of the cases
- Increase of anti-dsDNA antibodies in 70% of the cases

Diagnostic criteria based on the American College Rheumatology

There must be at least 4 of the 11 criteria met to diagnose SLE:

	Criteria of SLE
Dermatological	1. Malar rash (“butterfly rash”) with sparing of the nasolabial folds 2. Discoid rash 3. Photosensitivity 4. Oral or nasopharyngeal ulcers
Internal organs	1. Non-erosive arthritis involving at least two peripheral joints; it is rarely deforming 2. Pleuritis or pericarditis 3. Renal disorder: lupus nephritis with proteinuria; cellular casts 4. Neurological disorder: seizures, psychosis, and personality changes

Laboratory tests	1. Hematological disorders: autoimmune hemolytic anemia, thrombocytopenia, leukopenia, lymphopenia 2. Immunological findings: anti-dsDNA, anti-Sm, or antiphospholipid antibodies 3. Antinuclear antibodies (ANA)

Therapy of Lupus

- There is no cure available, and complete sustained remissions are not common. Therefore, the aim is control of acute flares, suppression of symptoms to an acceptable level, and prevention of organ damage.
- Patients without major organ involvement can be managed conservatively with analgesics and antimalarials. On the other hand, systemic glucocorticoids are the recommended treatment for any inflammatory life-threatening or organ-threatening manifestations of SLE.
- Cytotoxic or immunosuppressive agents, especially cyclophosphamide or mycophenolate, are added to glucocorticoids to treat serious SLE. For refractory serious SLE, various biologics are currently being studied. Also, studies of highly targeted interventions at various steps of immune regulation are in progress.
- The **blood pressure** must be optimally adjusted to prevent renal damage. Furthermore, a sufficient **prophylaxis of osteoporosis** should follow.
- Other preventive strategies include providing influenza and pneumococcal vaccines and suppressing recurrent urinary tract infections.
- Controlling other comorbidities, such as dyslipidemia, hyperglycemia, and obesity, is also recommended to improve SLE outcomes.

Prognosis of Lupus

Survival probability in systemic lupus erythematosus

The rate of survival is very good with optimal therapy. Lupus patients mostly die from cardiovascular complications.

Poor prognosis has been associated with high serum creatinine levels, hypertension, nephrotic syndrome, anemia, hypoalbuminemia, hypocomplementemia, antiphospholipid antibodies, male sex, ethnicity (African American, Hispanic with mestizo heritage), and low socioeconomic status.

References

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Notes