

# Review Article: Systemic Lupus Erythematosus in Gynecology

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## Abstract

The participation of the hypothalamic-hypophyseal neurosecretory system (HHNS) in fish reproduction using light, electron microscopy and immunocytochemistry was established by ecologo-histophysiological studies for the first time in the world literature. At the beginning of passing fish migrations a violation of the HHNS basic osmoregulative function, causing habitat change is revealed. Simultaneously the HHNS causes the neurotropic effect on the central nervous system (CNS) arousal in the form of a dominant state of "Migration impulse." At the beginning of spawning, HHNS also initiates spawning behavior and completes it by participating in the body's protective-adaptive reactions to natural physiological stress. The functional role of the HHNS in fish reproduction is to initiate energy-intensive (reproductive) processes of migratory and spawning behaviors and to complete spawning by suppressing the hyperactivity of target glands, which ensures the body's transition to energy-saving plastic exchange. The analysis of the key role of the HHNS in the integration of fish reproduction by the self-regulation principle has allowed the development of a constructive working scheme. New biotech methods of managing breeding time, rates of survival and growth of valuable fish species were developed on this basis. They are presented in the form of 10 inventions. To stimulate sex maturation, drugs of isolated anterior and posterior pituitary lobes were developed and introduced in sturgeon industry, increasing the extent of their fish-breeding use by 15% and saving the pituitary up to 40%. To delay puberty, a method of industrial fish breeders reservation in the critical salinity habitat of 4-8‰, both in seawater and in table salt solutions has been developed. On this basis, a full-system method of sturgeon and salmon fish populations reproduction, covering all stages of farm biotechnology has been developed. It is carried out by mass breeders reservation in sea cages, obtaining there offspring and, after the river fish-farm growing youngs to their readiness for migration, the final cultivation them in sea cages gardens till large life-resistant youngs. For the implementation of the proposed industrial biotechnology and year-round fish farming a new installation of recirculating aquaculture systems (RAS) hatcheries and farms was developed by means of the off-season underground conditioning of fish cultivation habitat and by the principle of natural-industrial engineering ecology. Due to the general aim – increasing the efficiency biotechnology of reproduction and logical relationships, all developments are integrated into the system of biotech management of fish population reproduction.

**Keywords:** neuroendocrine regulation of fish reproduction; artificial reproduction of sturgeon and salmon fish; management system of fish-farm populations reproduction

## Introduction

Autoimmune disorders are a collection of just about a hundred regarded disorders of autoimmunity [1]. In those disorders, the immune device will become misdirected and assaults the organs it changed into designed to protect. Autoimmune disorders have an effect on nearly all organ systems. Some of the extra not unusualplace autoimmune disorders are Graves's sickness, Hashimoto's thyroiditis, rheumatoid arthritis, and systemic lupus erythematosus (SLE, lupus).

## Autoimmune Diseases

When someone has an autoimmune disease, cytotoxic T cells or antibodies mistakenly assault the body's personal cells as though they undergo foreign

antigens [2]. Exactly what reasons autoimmune diseases isn't known. However, occasionally they arise after an person has recovered from an infection.

In the autoimmune disease myasthenia gravis, neuromuscular junctions do now no longer work properly, and muscular weak spot outcomes. In multiple sclerosis (MS), the myelin sheath of nerve fibers breaks down, and this reasons numerous neuromuscular disorders. A character with systemic lupus erythematosus (SLE) has numerous signs and symptoms previous to dying because of kidney harm. In rheumatoid arthritis, the joints are affected. Researchers propose that heart harm following rheumatic fever and type I

diabetes also are autoimmune illnesses. As yet, there are no treatment options for autoimmune diseases, however they may be managed with pills.

When someone has an immune deficiency, the immune system is not able to protect the body in opposition to disease. AIDS is an instance of an received immune deficiency. As a end result of a weakened immune system, AIDS sufferers display a extra susceptibility to a lot of diseases, and still have a higher risk of cancer. Immune deficiency can also be congenital (this is, inherited). Infrequently, a child can be born with an impaired B- or T-cell system due to a illness in lymphocyte development. In severe combined immunodeficiency disease (SCID), each antibody- and cell-mediated immunity are missing or insufficient. Without remedy, even not unusualplace infections may be fatal. Gene remedy has been a success in SCID sufferers.

## SLE

SLE (systemic lupus erythematosus) is a chronic autoimmune disorder that ordinarily impacts women [1]. It follows a relapsing and remitting route and impacts a couple of systems. Of all sufferers with lupus, 80% to 90% are women. The onset of lupus is often at some point of the reproductive phase. The cause of lupus is unknown. Proposed reasons consist of the following:

- Environmental factors, such as ultraviolet light from sunlight and fluorescent light bulb
- Reaction to medications, particularly sulfa drugs, penicillin, and tetracycline
- Epstein-Barr virus
- Hormones - Lupus signs and symptoms are worse during estrogen peaks
- Genetics - Lupus does appear in families; however, there may be no clean genetic link

Systemic lupus erythematosus is a multisystem, chronic autoimmune disease that usually impacts women of their 20s and 30s [3]. Autoantibodies involved include antinuclear antibodies (ANAs), anti-Ro, anti-La, anti-Sm, anti-dsDNA, and antiphospholipid antibodies.

- Lupus is related to poor obstetric effects which includes IUGR, prematurity, stillbirth, and spontaneous abortion. Active lupus nephritis poses the greatest maternal risk.
- Disease should be inactive for at the least 6 months previous to pregnancy.
- One third of sufferers revel in flares at some point of being pregnant, which ought to be handled with hydroxychloroquine, low-dose prednisone, pulse intravenous (IV) methylprednisolone, or azathioprine. High-dose prednisone and cyclophosphamide ought to most effective be utilized in intense flares whilst important.
- Distinction among a flare as opposed to preeclampsia (PEC) can be difficult, as each can result in proteinuria, thrombocytopenia, high blood pressure, or hyperuricemia. Transaminitis helps PEC. Generally, at some point of a lupus flare, supplement stages may be reduced. Red blood cell casts can be present on urinalysis.
- Neonatal lupus syndrome is rare, characterised with the aid of using pores and skin, hematologic, and different systemic lupus lesions and occasionally with the aid of using congenital heart block acting as much as a month after birth. Subsequent pregnancies carry up to 25% recurrence risk.

SLE impacts approximately 1 in every 2000 to 3000 pregnancies [4]. Widespread degeneration of connective tissue (in particular of the heart, kidneys, blood vessels, spleen, skin, and retroperitoneal tissue) happens with onset of the illness. The maximum marked pores and skin alternate is a function erythematous butterfly-shaped rash at the face. In the kidneys, fibrin deposits develop, plugging and blockading the glomeruli and main to necrosis and scarring. The thickening of collagen tissue withinside the blood vessels reasons vessel obstruction. This may be life-threatening to a woman if blood flow to essential organs will become compromised and life-threatening to a fetus if blood flow to the placenta is obstructed. Many

women with SLE have antiphospholipid antibodies, which increase the tendency for thrombi to form. In contrast, marked thrombocytopenia (decreased platelet count) is present, so clotting can be deficient. A woman can be taking a corticosteroid, NSAIDs, heparin, and salicylates to lessen disease signs and symptoms.

The clearly accelerated flow of corticosteroids at some point of being pregnant can also additionally reduce signs and symptoms in some women. In others, the leader complication of the disorder—acute nephritis with glomerular destruction—can also additionally arise for the primary time at some point of being pregnant.

With related nephritis, a woman's blood pressure will rise. She will broaden hematuria and reduced urine output. Proteinuria and edema can also additionally begin. It is hard to distinguish those signs and symptoms from the signs and symptoms of pregnancy-induced high blood pressure, besides that with being pregnant-triggered high blood pressure there may be no hematuria. Frequent tracking of serum creatinine stages is important to evaluate kidney function. If this value is over 1.5 mg/dL and proteinuria and a reduced creatinine clearance value also are present, the fetus is seriously threatened. Dialysis to take away extra creatinine or plasmapheresis to update platelets can be important to shield in opposition to hemorrhage at birth.

Women are requested to decrease salicylate use approximately 2 weeks previous to their expected beginning to lessen the opportunity of bleeding withinside the newborn. Intravenous hydrocortisone can be administered at some point of exertions to assist a woman regulate to the pressure at this time. During the postpartum period, there can be an acute exacerbation of signs and symptoms in a woman as corticosteroid stages once more fall to normal. Infants of women with SLE have a tendency to be small for gestational age due to a reduced blood go with the drift to the placenta. There is a extra-thanusual occurrence of spontaneous miscarriage and preterm birth. Infants can be born with a lupus-like rash, anemia, thrombocytopenia (low platelet count), and neonatal heart block. Newborn signs and symptoms final approximately 6 months after which fade. If congenital heart block happens, a newborn pacemaker can be important. Screening for the precise sort of autoantibodies present can be beneficial in predicting which newborns are liable to this.

Lupus erythematosus, one of the maximum not unusualplace and extreme autoimmune diseases, is visible maximum often in younger women and is characterised with the aid of using big harm to the vasculature withinside the pores and skin, articular tissues, heart, serous membranes (pleura and pericardium), and kidneys [5]. The skin rash frequently has a function look and is known as a malar rash as it impacts each cheeks (mala = cheek) joined with the aid of using an extension throughout the bridge of the nose. The rash is likewise occasionally known as a butterfly rash from its fancied resemblance to a butterfly with spread wings. The hemolytic anemia, leukopenia, and thrombocytopenia which might be common hematologic manifestations of lupus are due to autoantibodies. Patients can also additionally die of renal failure on account of the intense renal glomerular injury.

Patients with lupus develop a lot of autoantibodies directed in opposition to nuclear additives of the cell, which includes double-stranded DNA and a lot of nucleoproteins and phospholipids. Circulating antigen—autoantibody complexes (immune complexes) containing those nuclear antigens form and are deposited in kidney glomeruli and blood vessels in lots of locations. The malar rash is associated with immune complicated deposition withinside the pores and skin. Complement is activated, which generates an inflammatory response in which the immune complexes are deposited. Renal disease (lupus glomerulonephritis) is one of the maximum extreme outcomes of the disease (and may bring about rapid renal failure), however neurological, vascular

disease, irritation of the linings of organs, and arthritis all arise in all likelihood due to the systemic deposition of immune complexes. These complexes engage with supplement in selling tissue harm. Decreases withinside the levels of supplement additives withinside the flow of an SLE affected person heralds sickness exacerbation. Diagnosis of the sickness relies upon at the detection of the precise sorts of autoantibodies maximum in general related to SLE consisting of autoantibodies to double-stranded DNA and different nuclear additives.

The pathogenesis of lupus isn't properly understood however seems to be associated with a failure in cellular mechanisms that clean immune complexes (for this reason the sturdy affiliation of SLE with genetic defects in early supplement additives vital in binding to immune complexes). These supplement additives are in all likelihood to additionally play a function in clearing cellular particles and degraded DNA. Solar harm to the pores and skin can initiate dermal sickness in a affected person with SLE, possibly due to UV's capacity to motive photodamage to cells (and particularly DNA). Variation in genes vital in innate and adaptive immunity increase the risk of SLE, however no person gene has a sturdy impact. A mixture of a couple of genetic elements and intrinsic elements (which includes the presence of estrogen in women) performs a function withinside the pathogenesis of the disease.

## Gynecology

Obstetricians may be familiar with systemic lupus erythematosus (SLE), rheumatoid arthritis and type I (insulin-dependent) diabetes (IDDM) as traditional examples of autoimmune diseases that render pregnancies 'high risk' [6]. SLE predisposes to most important pregnancy wastage, with affected women experiencing recurrent miscarriages, intrauterine increase restrict and a excessive occurrence of pre-eclampsia and intrauterine dying. SLE is a multisystem disorder which usually impacts younger women, usually supplying with arthritis or arthralgia, even though others can also additionally present with pores and skin lesions (the classical red rash at the forehead and cheeks—giving the 'red wolf' look for which the disease is named), hair loss and pulmonary, renal, neurological (paralysis and convulsions) and hematological disease. Owing to the excessive pregnancy wastage, women with SLE are great controlled in tertiary facilities with gathered knowledge and revel in and the provision of multidisciplinary teams. Ideally, a woman ought to be assessed previous to being pregnant to optimize disease control, and being pregnant ought to be embarked upon at some point of a quiescent phase. Any disease flares ought to be handled aggressively, and steroid therapy (prednisolone) with cautious tracking has been proven to be secure at some point of being pregnant. The fetus is a patient too, who should be subjected to excessive surveillance with regular growth scans, Doppler blood flow studies and timely shipping whilst there may be proof of compromise (intrauterine growth restrict because of placental insufficiency is a not unusualplace characteristic of SLE). Some newborns display brief capabilities of SLE, and congenital heart block is an extraordinary however well-recognized complication. With care in specialised facilities, the analysis for pregnancy outcome in women with SLE has shown dramatic improvement. Flares withinside the puerperium aren't uncommon, and continued surveillance is therefore crucial.

From an immunological point of view, there seems to be a breakdown in each B and T cell tolerance that outcomes withinside the production of IgG antibodies which apprehend a extensive variety of self-antigens which includes DNA, DNA—protein complexes and RNA-protein complexes. Given the range of the autoreactive antibodies, it's far infrequently unexpected that SLE ought to be a multisystem disorder.

The fact that the chance of equal twins each having SLE will increase tenfold over the 2% chance visible in non-equal twins shows a sturdy genetic

component to the disease. Multiple MHC and non-MHC genes had been identified, every of which appears to growth barely the chance that someone will agreement SLE.

Two drugs that obstetricians and gynecologists may be very familiar with had been implicated withinside the initiation of SLE: hydralazine used withinside the treatment of high blood pressure in pregnancy, and minocycline, an antibiotic used as long-time period treatment for acne. However, different pills too had been implicated, which includes procainamide and Dpenicillamine. No unique microbial contamination has been related to the initiation of SLE. Two animal models of SLE have counseled that defective apoptosis can also additionally play a function: mice that lack useful genes for Fas or Fas ligand showcase SLE-like signs and symptoms. Apoptosis brought about thru Fas appears to have an vital function in deleting autoreactive lymphocytes, which might be then concept to cause sickness whilst they're now no longer deleted. It ought to be emphasised that human SLE isn't related to Fas deficiency, and different mechanisms are in all likelihood to be responsible.

**Infertility** Many sorts of antibodies had been implicated withinside the pathophysiology of unexplained infertility [7]. Antiovarian, antispermatozoal, and anticardiolipin antibodies have been established in women with unexplained infertility. It has been mentioned that insufficient maternal immunosuppression may motive embryo rejection in that group. The incidence of celiac sickness is likewise better in those women as compared with fertile women. Elevated anti-C. trachomatis antibodies may be detected in more than 70% of women with tubal occlusion. C. trachomatis has a right away cytotoxic impact at the mucosa of the fallopian tube, ensuing in lack of microvilli. Permanent tubal harm is predominantly a result of a bunch immune reaction to chronic or repeated contamination. Antiphospholipid antibodies are related to thrombosis and infarction withinside the placenta. They inhibit the discharge of hCG from human placental explants, block in vitro trophoblast migration, invasion, and multinucleated cell formation, inhibit trophoblast cell adhesion molecules, and set off the supplement at the trophoblast surface inducing an inflammatory reaction. Antisperm and antiovarian antibodies can also additionally have an adverse impact on fertilization, early embryonic improvement, and implantation. Between 10 and 30% of women with untimely ovarian failure have a concurrent autoimmune disease; the maximum usually mentioned one is hypothyroidism. It additionally has a near courting among myasthenia gravis, systemic lupus erythematosus, rheumatoid arthritis, and Crohn's disease.

It has been proven that anticardiolipin antibodies have been undoubtedly correlated to plasma levels of F2-isoprostanes, sensitive markers of lipid peroxidation. Paraoxonase-1 (PON-1), an antioxidant, has been observed to be reduced and inversely correlated with anticardiolipin antibodies and directly with total antioxidant status. Increased oxidative pressure can be involved in early stages of antiphospholipid syndrome. There is likewise a near relationship among oxidative pressure and autoimmune diseases. MDA (malondialdehyde) is accelerated and sulfhydryl organizations have been reduced in sufferers with systemic lupus erythematosus. PON-1 pastime and vitamin E changed into decrease in sufferers with different autoimmune diseases consisting of psoriasis, vitiligo, and alopecia. Oxidative stress is related to autoimmune thyroid destruction and N-acetyl-L-cysteine reduces ROS and restores thyroid morphology.

## Symptoms

- Fatigue [1]
- Fever
- Weight loss
- Pain in the joints
- Musculoskeletal pain

- Swollen and discolored nailbeds
- Persistently swollen lymph nodes
- Raynaud's phenomenon
- Thinning hair
- Pathology of the skin, joints, and internal organs
- Pathology of the heart, lungs, and kidneys
- Butterfly rash on the face
- Photosensitivity
- Swollen hands, wrists, knees, and feet

## Malignancies

The prevalence of women being diagnosed with cancer earlier than age 40 is about 2% [8]. Due to advances within the treatment of many malignancies, the majority of cancer sufferers continue to exist their diagnosis, with an usual 5-year survival rate greater than 80%. Consequently, fertility renovation has turned out to be an increasing number of important paradigms for quality of life after cancer. Advances in assisted reproduction techniques (ART), which include ovarian tissue cryopreservation and transplantation, oocyte cryopreservation, and novel ovulation induction approaches, provide concrete hopes to women at risk of being rendered sterile with the aid of using their treatments.

In addition to cancer sufferers, fertility preservation strategies also are presented to sufferers exposed to chemotherapy for different clinical situations consisting of systemic diseases as lupus, hematological disorders consisting of thalassemias, multiple sclerosis, and other autoimmune situations. Furthermore, and extra recently, fertility renovation alternatives had been presented additionally to women inquisitive about delaying childbearing. Frequently cited as "elective or social" fertility preservation, many women are specially resorting to oocyte cryopreservation as a method to protect their future reproductive chances.

## Diagnosis

SLE is often difficult to diagnose [9]. The antinuclear antibody (ANA) is positive in 90% of cases, however the specificity of this test is poor (i.e., there are often false positives), while the anti-double-stranded DNA and anti-Smith antibodies are positive in 50% and 30% of sufferers, respectively. The ACR recommends ANA checking out most effective in sufferers with or extra unexplained signs or symptoms (SORC). Care should be exercised now no longer to test sufferers with isolated myalgias or arthralgias due to the high degree of false positives and the potential emotional outcomes of fear of this disease. ANA testing is positive in 5% of examined women and older sufferers however normally at a titer this is 1:320. Four of the 11 diagnostic ACR standards must be met for a diagnosis of SLE.

The ACR recommends referral to a rheumatologist for sufferers with function signs and symptoms of SLE and a positive ANA, especially in instances with more significant or unstable disease (SORC). Treatment for SLE consists of sunscreen (with UVB/UVA coverage) for pores and skin problems, NSAIDs and a lot of medications much like the ones utilized in RA: hydroxychloroquine, low- or high-dose steroids, methotrexate or azathioprine used as steroid-sparing pills, and in the end immunosuppressive agents (intravenous cyclosporine or cyclophosphamide). Identifying and treating cardiovascular danger elements is especially important. Targeted biologic healing procedures are below improvement, which can also additionally modify treatment algorithms within the future.

Drug-related lupus refers back to the improvement of a lupus like syndrome after exposure to certain medications, and commonly outcomes in fast decision of the signs and symptoms on withdrawal from the drug. Autoantibodies can also additionally persist for six to twelve months.

Although there are numerous pills implicated in drug-related lupus, the 2 maximum probably pills are procainamide and hydralazine.

Patients with SLE had been shown to have autoantibodies of their blood years earlier than the signs and symptoms of SLE appear [10]. SLE is a good deal extra conventional in women and commonly provides within the childbearing years. According to the American College of Rheumatology, the diagnosis of SLE is made whilst 4 or more of the following eleven standards are present:

1. Malar (butterfly) rash
2. Discoid rash
3. Photosensitivity
4. Oral ulcers
5. Polyarthrititis
6. Serositis (pleuritis or pericarditis)
7. Renal disorder (persistent proteinuria or cellular casts)
8. Neurologic disorder (seizures or psychosis)
9. Hematologic disorder (hemolytic anemia with reticulocytosis or leukopenia or thrombocytopenia)
10. Immunologic disorder (positive for anti-dsDNA antibody or anti-Sm antibody or antiphospholipid antibody lupus anticoagulant or a false-positive serologic test result for syphilis)
11. Positive antinuclear antibody

In addition to blood and urine tests, the workup ought to consist of chest radiography and echocardiography to display for pleural effusions, pulmonary infiltrates, and pericardial effusion.

Treatment alternatives consist of NSAIDs; antimalarials consisting of hydroxychloroquine; corticosteroids; and immunosuppressant medications consisting of azathioprine, cyclophosphamide, and methotrexate.

## Conclusion

Patients suffering from systemic lupus erythematosus have a wide range of autoantibodies to various antigens, and are typical antibodies against nuclear and cytoplasmic components. Under the influence of external factors, a clinically pronounced picture of the disease can develop in a predisposed population. Among these factors, viral infections are significant. UV rays of the light spectrum can cause skin changes and intensify the disease. Taking some medications can cause a disease that is very similar to SEL (penicillin, antiepileptics, etc.). It seems that diet can also affect the course and manifestation of the disease. The number and variety of antibodies that occur in lupus is greater than in any other disease and it, along with other unknown factors, determines which symptoms will develop. Therefore, the symptoms and their severity and severity vary from person to person. Lupus can be a moderate or devastating, disabling and fatal disease. Because there is a wide variety of symptoms, lupus can resemble many other diseases. For example, the connective tissue of the joints is usually affected by the disease, resulting in arthritis that may resemble rheumatoid arthritis. Lupus can be similar to epilepsy or some mental disorders when the brain is affected.

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