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## **ELISA Test for the Diagnosis of Autoantibodies Among Antenatal Mothers: A Comprehensive Overview**

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### **Introduction**

Autoimmune diseases are increasingly recognized as a significant health concern for pregnant women. These conditions can lead to complications during pregnancy and may have long-lasting effects on both the mother and her unborn child. Among the various diagnostic tools available to identify these autoimmune diseases, the Enzyme-Linked Immunosorbent Assay (ELISA) test stands out as a highly effective method for detecting autoantibodies among antenatal mothers. This article provides a comprehensive overview of the ELISA test, its significance in antenatal care, and its role in the early diagnosis and management of autoimmune diseases in pregnant women.

### ***Background on Autoimmune Diseases and Pregnancy***

Autoimmune diseases occur when the immune system mistakenly attacks the body's healthy cells and tissues. This can lead to inflammation and damage to various organs, affecting their normal functioning. Autoimmune diseases can cause a range of symptoms and complications, depending on the organ or system affected.<sup>1</sup>

Pregnancy is a unique period in a woman's life where her immune system undergoes significant changes to protect and nurture the developing fetus. However, these changes can also predispose pregnant women to autoimmune diseases or exacerbate existing conditions. Autoimmune diseases during pregnancy can pose serious risks to both the mother and the fetus, leading to complications such as preterm labor, miscarriage, low birth weight, and congenital anomalies.<sup>2</sup>

### ***The Importance of Autoantibody Detection Among Antenatal Mothers***

Autoantibodies are proteins produced by the immune system that mistakenly target the body's own tissues. They are hallmarks of various autoimmune diseases and can be used as diagnostic biomarkers to detect the presence of an underlying condition. Early detection of autoantibodies among antenatal mothers is crucial for several reasons:<sup>3</sup>

Timely diagnosis and treatment of autoimmune diseases can prevent or reduce the severity of pregnancy complications, ensuring better maternal and fetal outcomes.

The presence of autoantibodies can serve as a warning sign for healthcare providers to closely monitor the pregnancy and provide appropriate interventions to mitigate risks.<sup>4</sup>

Some autoantibodies can cross the placenta and affect the developing fetus, leading to congenital anomalies or neonatal autoimmune diseases. Identifying these autoantibodies allows for proper prenatal care and postnatal management to minimize adverse outcomes.<sup>5</sup>

### ***The ELISA Test: A Powerful Diagnostic Tool***

The Enzyme-Linked Immunosorbent Assay (ELISA) is a widely used laboratory test that has been instrumental in detecting autoantibodies in various autoimmune diseases. The test involves immobilizing antigens (target proteins) on a solid surface, followed by the addition of patient serum containing antibodies. If autoantibodies specific to the immobilized antigen are present in the serum, they will bind to the antigen. A secondary enzyme-linked antibody is then added to detect the bound autoantibodies, and a colorimetric reaction is triggered, allowing for the quantification of the autoantibodies.<sup>6</sup>

### ***The ELISA test offers several advantages in the context of antenatal care:***

High sensitivity and specificity: The ELISA test has been proven to be highly sensitive and specific in detecting autoantibodies, allowing for accurate diagnosis of autoimmune diseases among pregnant women.

Adaptability: The ELISA test can be customized to detect a wide range of autoantibodies associated with various autoimmune diseases, making it a versatile diagnostic tool.

Cost-effectiveness: The test is relatively inexpensive and requires minimal specialized equipment, making it accessible to a wide range of healthcare facilities.<sup>7</sup>

### ***Common Autoantibodies and Associated Autoimmune Diseases in Pregnancy***

The ELISA test can be used to screen for numerous autoantibodies associated with different autoimmune diseases that can affect pregnant women. Some of the most common autoantibodies and their related autoimmune diseases include:

Anti-nuclear antibodies (ANA): ANAs are associated with various autoimmune diseases, such as systemic lupus erythematosus (SLE), Sjögren's syndrome, and mixed connective tissue disease. SLE, in particular, can lead to complications like preeclampsia, preterm birth, and intrauterine growth restriction during pregnancy.<sup>8</sup>

Anti-phospholipid antibodies (aPL): These antibodies are related to antiphospholipid syndrome (APS), a condition that increases the risk of blood clots, miscarriages, and stillbirths in pregnant women. Early detection and treatment with anticoagulant therapy can significantly improve pregnancy outcomes for women with APS.<sup>9</sup>

Anti-thyroid antibodies: Autoantibodies targeting thyroid components, such as thyroglobulin and thyroid peroxidase, can cause autoimmune thyroid diseases like Hashimoto's thyroiditis and Graves' disease. These conditions can lead to maternal and fetal complications, such as miscarriage, preterm birth, and fetal growth restriction.<sup>10</sup>

Anti-Ro/SSA and anti-La/SSB antibodies: These autoantibodies are commonly found in SLE and Sjögren's syndrome. They can cross the placenta and cause neonatal lupus, a rare condition characterized by a temporary skin rash, liver problems, and heart block in the newborn.<sup>11</sup>

### ***The Role of ELISA in Antenatal Care***

The ELISA test plays a crucial role in antenatal care for women at risk of developing autoimmune diseases or those with a known history of autoimmune conditions. By detecting autoantibodies early in pregnancy, healthcare providers can:

Implement appropriate treatment strategies, such as immunosuppressive medications or anticoagulant therapy, to manage the autoimmune condition and reduce pregnancy complications.<sup>12</sup>

Monitor the pregnancy more closely for signs of complications, allowing for timely interventions to ensure the best possible outcomes for the mother and her unborn child.<sup>13</sup>

Provide appropriate prenatal counseling to educate expectant mothers on the potential risks associated with their autoimmune disease and the necessary precautions to minimize these risks.<sup>14</sup>

### ***Limitations and Future Directions***

Despite its many advantages, the ELISA test is not without limitations. False positives and false negatives can occur, potentially leading to misdiagnosis or delayed diagnosis of autoimmune diseases. Additionally, the test may not detect low levels of autoantibodies, which can be problematic in the early stages of an autoimmune disease.<sup>15</sup>

Emerging technologies, such as multiplex bead-based assays, hold promise for improving the sensitivity and specificity of autoantibody detection in antenatal care.<sup>16</sup> These techniques can simultaneously screen for multiple autoantibodies in a single test, potentially reducing the time and cost of diagnosis.<sup>17</sup>

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## **Conclusion**

Autoimmune diseases represent a significant concern for antenatal mothers, as they can lead to complications that adversely affect both the mother and her unborn child. The ELISA test has emerged as a powerful tool for the detection of autoantibodies, providing valuable diagnostic information that can guide the management of autoimmune diseases during pregnancy. By incorporating the ELISA test into routine antenatal care, healthcare providers can better identify and address autoimmune conditions, ultimately improving pregnancy outcomes and ensuring the health of both the mother and her child.

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**Reference**

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- 1) Aydin S. A short history, principles, and types of ELISA, and our laboratory experience with peptide/protein analyses using ELISA. *Peptides*. 2015 Oct;72:4-15. [PubMed]
- 2) Engvall E. The ELISA, enzyme-linked immunosorbent assay. *Clin Chem*. 2010 Feb;56(2):319-20. [PubMed]
- 3) Shah K, Maghsoudlou P. Enzyme-linked immunosorbent assay (ELISA): the basics. *Br J Hosp Med (Lond)*. 2016 Jul;77(7):C98-101. [PubMed]
- 4) Konstantinou GN. Enzyme-Linked Immunosorbent Assay (ELISA). *Methods Mol Biol*. 2017;1592:79-94. [PubMed]
- 5) Leng SX, McElhane JE, Walston JD, Xie D, Fedarko NS, Kuchel GA. ELISA and multiplex technologies for cytokine measurement in inflammation and aging research. *J Gerontol A Biol Sci Med Sci*. 2008 Aug;63(8):879-84. [PMC free article] [PubMed]
- 6) Gelkop S, Sobarzo A, Brangel P, Vincke C, Romão E, Fedida-Metula S, Strom N, Ataliba I, Mwiine FN, Ochwo S, Velazquez-Salinas L, McKendry RA, Muyldermans S, Lutwama JJ, Rieder E, Yavelsky V, Lobel L. The Development and Validation of a Novel Nanobody-Based Competitive ELISA for the Detection of Foot and Mouth Disease 3ABC Antibodies in Cattle. *Front Vet Sci*. 2018;5:250. [PMC free article] [PubMed]
- 7) de la Rica R, Stevens MM. Plasmonic ELISA for the ultrasensitive detection of disease biomarkers with the naked eye. *Nat Nanotechnol*. 2012 Dec;7(12):821-4. [PubMed]
- 8) Kohl TO, Ascoli CA. Direct Competitive Enzyme-Linked Immunosorbent Assay (ELISA). *Cold Spring Harb Protoc*. 2017 Jul 05;2017(7):pdb.prot093740. [PubMed]
- 9) Kohl TO, Ascoli CA. Indirect Immunometric ELISA. *Cold Spring Harb Protoc*. 2017 May 01;2017(5) [PubMed]
- 10) Kohl TO, Ascoli CA. Immunometric Double-Antibody Sandwich Enzyme-Linked Immunosorbent Assay. *Cold Spring Harb Protoc*. 2017 Jun 01;2017(6):pdb.prot093724. [PubMed]
- 11) Tighe PJ, Ryder RR, Todd I, Fairclough LC. ELISA in the multiplex era: potentials and pitfalls. *Proteomics Clin Appl*. 2015 Apr;9(3-4):406-22. [PMC free article] [PubMed]
- 12) Kuo HT, Yeh JZ, Wu PH, Jiang CM, Wu MC. Application of immunomagnetic particles to enzyme-linked immunosorbent assay (ELISA) for improvement of detection sensitivity of HCG. *J Immunoassay Immunochem*. 2012;33(4):377-87. [PubMed]
- 13) Tiscione NB. The Validation of ELISA Screening According to SWGTOX Recommendations. *J Anal Toxicol*. 2018 Apr 01;42(3):e33-e34. [PubMed]
- 14) Workowski KA, Bolan GA., Centers for Disease Control and Prevention. Sexually transmitted diseases treatment guidelines, 2015. *MMWR Recomm Rep*. 2015 Jun 05;64(RR-03):1-137. [PMC free article] [PubMed]
- 15) Sherwani S, Chowdhury M, Bugert JJ. ELISA for Molluscum Contagiosum Virus. *Curr Protoc Microbiol*. 2017 Nov 09;47:14A.6.1-14A.6.9. [PubMed]
- 16) Atzori L, Deidda S, Aste N. Enzyme-linked immunosorbent assay in autoimmune blistering diseases: preliminary experience of the Dermatology Department of Cagliari. *G Ital Dermatol Venereol*. 2008 Feb;143(1):1-8. [PubMed]
- 17) Weng X, Gaur G, Neethirajan S. Rapid Detection of Food Allergens by Microfluidics ELISA-Based Optical Sensor. *Biosensors (Basel)*. 2016 Jun 07;6(2):24. [PMC free article] [PubMed]