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Immune Infertility- An Emerging Problem of Dairy Industry

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Introduction

In India reproductive disorders leading to infertility have now emerged as a serious problem in the way of cross breeding programme. Infertility in cattle caused by numerous factors such as managemental, hereditary, anatomical, nutritional, hormonal and immunological. In female it may be due to obstruction in fallopian tube, problem in ovulation, endometritis, and quality of cervical mucus and in male this is due to impairment of sperm quality. Recently, an important cause of infertility is due to presence of antibodies against spermatozoa as both the sexes can make antibodies arise leads to immunologic infertility. Antibodies are powerful tools for unlocking normal physiological problems that affect fertility. In addition, when antibodies are generated due to abnormal situations, fertility is depressed or completely inhibited for varying periods of time.

Mechanism of development of immune infertility

The reproductive tracts of both male and female are lined by mucosa which remains in direct contact with the external environment. The female reproductive tract is capable of generating an immune response to ejaculated sperm that can cause infertility. In the bovine cases of immunological infertility are rare because the cow is exposed to an antigenic dose of semen only once every 21 days at estrus. In addition, the high concentration of estrogen suppresses an immune response and promotes phagocytosis of non-fertilizing sperm. This phagocytosis in uterine secretion flushes sperm from the cow's tract without stimulating the lymph nodes in the genital region. In sub



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mucosa of female genital tract abundant of lymphocytes, macrophages and lymphatic vessels are present, where both local and systemic immune response occurs. Once spermatozoal antigen is deposited in the female genital tract, humoral and cellular immunity are generated results into destruction of spermatozoa antigens. There are four types of specific antigens are observed in bovine spermatozoa. One each antigen is located in head and tail; two others are common to both head and tail. They also present in seminal plasma and in the head of epididymis. The antiserum antibodies may affect reproduction by several mechanisms individually/simultaneously.

- Antiserum antibody may affect by direct humoral effect or by indirect cell mediated effect.
- Agglutination or immobilization of spermatozoa, sperm cytotoxicity
- Interference with capacitation/acrosome reaction.
- Inhibition of sperm attachment/penetration of egg membrane.
- Prevention of cervical mucus penetration.
- Interference with embryo implantation, and
- Enhancement of phagocytosis of sperm in the genital tract by macrophages.

Diagnosis

- Immune/immunological infertility is diagnosed when spontaneously produced antibodies bind to the antigens occurring on either the male or female gametocytes. In particular, antibodies bind to seminal proteins or structures present on the sperm or oocyte.
- Detection of sperm antibody in the sera by- Agglutination and immobilization of sperm, detection of antiserum antibodies by ELISA Test- Antisperm antibody (ASA) diagnosed by this method and Kibrick's tube slide agglutination test.
- Detection of sperm antibodies in genital secretion- In male antibody is demonstrated in semen and in female in cervical mucus.

Treatment

Once antibody against sperm is detected in the female genital tract to the spermatozoa antigen should be reduced, results in reduction of existing immunity and thus improvement in fertility observed.



Conclusion

Immune infertility acts as emergent problem this is due to the heterogeneity of sperm antigens and certain special antigens present in the sperm of autoimmune infertile bulls play important role in development of immunological infertility. The immune system plays important role in normal reproduction in both sexes. The immune system also plays devastating role in infertility. Reproductive immunology is a powerful tool for unlocking normal fertility problems and various forms of infertility or reproductive disorders.

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