

## InfoSheet : ANTI-SPERM ANTIBODIES (ASABs)

### INTRODUCTION

Our immune systems work in much the same way as Immigration inspectors - they screen everything they can in our bodies, and any unauthorized "travellers" are targeted and expelled. But instead of documentation, the immune system checks specific markers, called antigens, on the surface of each cell or germ. Anything which has unrecognized markers appears to be foreign to our immune surveillance systems, which then mobilizes defences against it. These defences include the development of antibodies which target the antigens specifically.

There are many markers on each cell – including those which tell the immune system that they belong to that body, as well as identifying what sort of cell they are. To prevent the development of antibodies to ourselves, the immune system is "educated" to recognize our own cells in the first few weeks of our lives. After this time, any potential invaders of our systems are recognized because they have markers that our immune system does not recognize as "friendly". This is how we are protected from infections.

### WHY DO WE PRODUCE ANTIBODIES AGAINST SPERM?

While this system works extremely well, there is a potential problem for sperm. Sperm are not made until a boy reaches puberty, well after his immune system has been educated. Therefore, his immune system will not recognize sperm cells as "friendly" because the sperm antigens are new. This is not usually a problem because the site where the sperm are made in the testes is hidden from the immune system. But sometimes this protective barrier is broken – by inflammation (such as that caused by mumps in men or in boys after puberty) or by testicular injury – and this allows the immune system to see the sperm and their antigens for the first time, and to develop antibodies against them. Also, antibodies which are made to fight an infection will sometimes coincidentally cross-react with the sperm antigens and so these antibodies will bind onto the sperm. It is therefore possible for women to have antibodies which bind to sperm, too.

### WHAT DO ASABs DO?

When an antisperm antibody screen is performed in the lab it is not unusual to find low levels of antibody binding. The World Health Organization considers that levels of 50% binding or higher have the potential to interfere with fertility, particularly if this binding is in the head region of the sperm.

Antibodies themselves do not kill cells – they are just large protein molecules which bind onto their target antigens and signal other immune reactions to start. This means that when antibodies bind onto sperm, they don't usually kill the sperm, and the sperm DNA is not affected. However, the presence of antisperm antibodies can interfere with both sperm transport through the female reproductive tract, and with fertilization. If there are antibodies bound onto the sperm, then they cannot penetrate the cervical mucus which is at the entrance to the woman's reproductive tract. Similarly, if the woman's cervical mucus contains antibodies to the sperm, it will not allow them to enter. But even if the cervix is bypassed, by IUI or by IVF, sperm with antibodies bound to their heads are inhibited from being able to bind to the egg (since the relatively large antibody molecules get in the way of sperm-egg recognition and binding).

### WHAT ARE THE TREATMENT OPTIONS?

It used to be that the presence of significant levels of antisperm antibodies meant the end of the line for fertility treatment. However, the development of ICSI (intracytoplasmic sperm injection), where a single sperm is injected directly into the egg, has allowed us to bypass the sperm transport and sperm-egg recognition processes on the way to fertilization. Because of this, ICSI has been used successfully over the past ten years for assisted conception using sperm with antibodies bound to their surface, and particularly to the head region. It appears that the antibody molecules have no effect on the egg or the developing embryo, and it may be that the egg breaks the antibody molecule

apart and recycles its components. So there is no increased risk to an embryo from these antisperm antibodies.

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