VivaGel™: in trials now to meet an urgent medical need

> VivaGel™ is a vaginal gel being developed by Starpharma, a global leader in the application of nanotechnology to pharmaceuticals.

> Starpharma's aim is that women will be able to use VivaGel™ as a "Vaginal Microbicide" to protect themselves from sexually transmitted infections, such as genital herpes and HIV.

> There are currently no vaginal microbicides available to women.

A global medical problem

The spread of genital herpes and AIDS (caused by HSV-2 and HIV viruses respectively) continues apace, despite education campaigns designed to promote safe sex messages and practices. Around the world, researchers in academia and industry have been attempting to develop vaccines for these diseases so far with limited or no success.

Genital Herpes

Approximately 45 million Americans are infected with HSV-2. Genital herpes is a recurrent, lifelong viral infection and one of the most prevalent sexually transmitted diseases, estimated to infect between 15% and 25% of male and female adults, respectively, in developed countries. This figure is expected to rise to almost 40% for males and 50% for females by 2025, unless effective preventive measures can reverse the trend. Additionally, HSV-2 infection can make people more susceptible to infection by HIV, making its prevention even more important.

HIV

HIV infection is a major health burden in both the Western world and developing countries. Approximately 40 million people worldwide are infected with HIV. In the US, AIDS is the number one cause of death among African-American women aged 25 to 34.

The United Nations has estimated that as many as 90 million people in Africa alone may be infected with HIV over the next 20 years if the spread cannot be stopped.

AIDS is difficult and expensive to treat and there is no cure.

Prevention is better than cure

A new approach is required to control the spread of HIV/AIDS and genital herpes. With no available cure and limited success of existing strategies for prevention of HIV and HSV-2 infection, a vaginal microbicide is recognised as a key element in the fight to slow the spread of genital herpes and AIDS.

Starpharma's goal is to show that VivaGel™ is a safe and effective vaginal microbicide that women could use to protect themselves from these infections, and to stop the problem at its source. Much work is already done: it is known that in test tubes and in animals the gel is very effective at inactivating these viruses. It has also been successfully tested for safety in animals and in an initial human trial. More work is now needed: Starpharma and expert partners are working on a program to demonstrate safety in larger populations, and to prove whether VivaGel™ is in fact as effective in women as animal studies have led us to anticipate.

"If I had a magic bullet to accelerate something it would be the microbicide."

Bill Gates, on stopping HIV, July 2006

Another important feature of VivaGel™, if approved, is that it would be women who would most directly manage its use (unlike condoms), giving them more power to protect themselves from STIs.

VivaGel™ would be used as a single-use, pre-filled vaginal applicator (pictured). The applicator is already used in other vaginal applications. The economics of the product - active ingredient, formulation and applicator - are seen to be well matched to a mass market application.

VivaGel™ has also been shown to be compatible with condoms in laboratory tests.

Image of VivaGel™ in proposed single-use, pre-filled applicator

"…by age 25 half of all sexually active people in the United States will have acquired a Sexually Transmitted Infection"

US Government Estimate

Dendrimers: A New Strategy

The active ingredient of VivaGel™ is a dendrimer. Dendrimers are carefully-assembled tiny particles with many potential applications in medicine and industry.

The surface of the active dendrimer in VivaGel™ is covered with regions that are thought to bind to the HIV or HSV-2 viruses. Scientists believe that the microbicidal activity already proven in animals arises because the viruses cannot enter cells when the dendrimer is attached, and so cannot cause infection.

Clinical progress

HIV

VivaGel™ has undergone a Phase I randomised, double-blinded clinical trial involving 36 healthy female volunteers who were sexually abstinent during the trial. The results showed VivaGel™ to be safe and well tolerated over a range of doses of active component, when applied vaginally once daily for seven consecutive days.

In 2005, VivaGel™ was awarded US$20.3 million from the National Institute of Allergy and Infectious Diseases (NIAID) of the US National Institutes of Health (NIH) toward the development of VivaGel™. This is one of the largest awards ever made in Australia by the NIAID. The NIH is the primary Federal agency in the US for conducting and supporting medical research.

In January 2006, the US Food and Drug Administration (FDA) designated VivaGel™ as *Fast Track* for development against HIV. This recognition by the FDA means that the New Drug Application to the FDA can be expedited and could be reviewed within as few as 6 months after filing, compared to a typical 13 month review process in the absence of designation.

In August 2006 Starpharma started a "male tolerance" study to show that exposure of the genitals to VivaGel™ does not cause harm to men. A safety trial on HIV positive women in Thailand is in the planning stage.

Genital Herpes

In 2006, Starpharma signed a second agreement with the NIAID for the funding of another clinical safety trial of VivaGel™ relating to the prevention of genital herpes. With this funding in place an Investigational New Drug application was lodged, and in July it was cleared by FDA allowing the trial to commence. The trial will be run concurrently in Kisumu, Kenya, and San Francisco, United States, commencing later this year.

Potential as a contraceptive

In a recent independent study undertaken at John Hopkins University in the USA, the active ingredient in VivaGel™, SPL7013, exhibited a potent contraceptive effect when tested in animals.
The connection between this effect and anti-viral activity may be that cellular fusion is a common feature of both fertilisation of an egg by sperm, and also of viral infection, consistent with laboratory research which has already shown that certain kinds of cellular fusion are inhibited by SPL7013.

If this result is replicated in humans then the combination of VivaGel™ as a preventative of STIs and also as a contraceptive could add greatly to the product's value to sexually active women.

starpharma

Further information

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