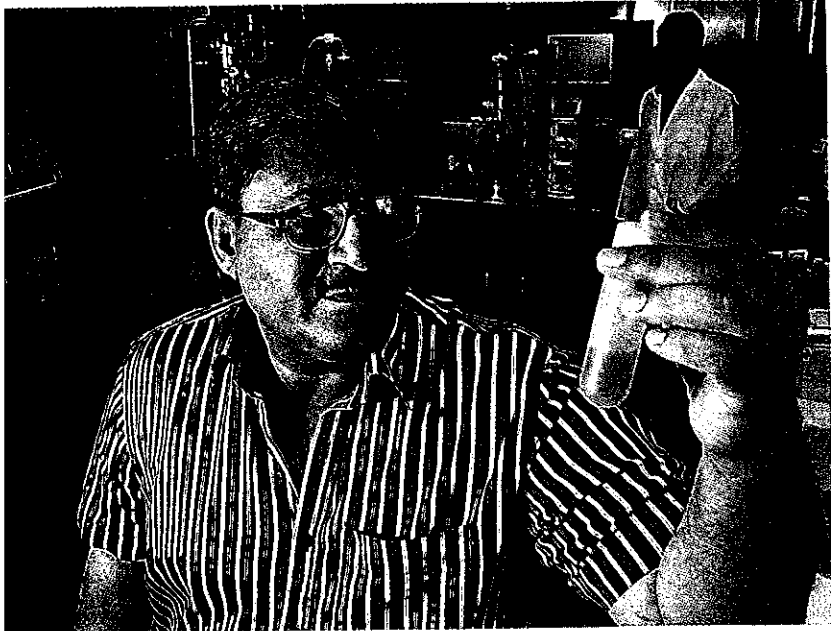


COVERSTORY

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SHOT AT A BETTER TOMORROW: Dr Girish Sahni at work in his lab

Hope, in doses

Breakthrough drug for removal of clot will make treatment more effective and affordable

BY GUNJAN SHARMA

They say that lights of this laboratory have never been switched off in the last 22 years—since the time the institute decided to work on finding a cheaper alternative to tPA (Tissue Plasminogen Activator). A single shot of this exorbitantly expensive drug can save lives of patients of an ischemic attack. The pungent smell of acetic acid fills the lab on the first floor of the Institute of Microbial Technology in Chandigarh. The laboratory, a 30 by 20 feet hall, is crammed with half-a-

dozen bulky biotechnology instruments, innumerable beakers, flasks, vials, bottles of reagents and other chemicals.

In 1993, a team of 15 microbiologists, including director Dr Girish Sahni, started working on streptokinase, a protein secreted by streptococci bacteria. Streptokinase helps activate plasminogen, an enzyme present in the human blood that prevents clotting. They first isolated streptokinase in its natural form through fermentation, which was made available to patients by Cadila Pharmaceuticals in 2001, leading to the fall in price of the drug.

In the second phase of their research, they worked on recombinant streptokinase. For this, the gene was extracted from streptokinase and cultured in E.coli. The process became 5 to 10 times more efficient. The recombinant therapeutic drug was given to a Chennai-based bulk drug manufacturing company, Shasun Drug. After passing various regulatory norms, it reached the market in 2009. Presently, around 15 brands are selling it in the market.

It was a major achievement because the recombinant streptokinase brought down the cost to a few thousand rupees. Though the medicine is still being used widely by the patients who can't afford tPA, which costs close to ₹1 lakh per dose, it has one drawback—it has to be given slowly as an infusion in saline water, which requires a proper medical set-up. Besides this, streptokinase activates plasminogen, which further triggers plasmin, an active protein. It eats away other blood factors, including the fibrinogen needed for healthy clotting, making all the vessels prone to bleed, especially in the first six to seven hours of the administration

WONDER

Streptokinase, a protein produced by the *Streptococcus* bacteria, is among the most widely used clot-busters. It is beneficial for those who suffer ischemic heart attacks.

Streptokinase works by activating plasminogen in blood, which produces the clot-dissolving enzyme plasmin.

The Institute of Microbial Technology, Chandigarh, has developed third-generation streptokinase. It has now entered phase II of human trials.

It will help those who suffer from heart attacks in places where surgical facilities are not available.

Unlike recombinant streptokinase, it will remain in the blood till it encounters the clot. It will act only on the clot, minimising side-effects and making its administration easy.

It can be given as a single shot.

of the dose. So, the patient has to be kept under close observation in a controlled environment to avoid any injury or stress. Besides, in 5 per cent of cases, the drug could also lead to uncontrolled bleeding and a fall in blood pressure.

So, the scientists in IMTECH again undertook an ambitious project. This time, they wanted to make the drug clot-specific. They decided to protein-engineer the streptokinase to achieve the objective. And in 2001, they succeeded. In 2006, IMTECH licensed India's first bio-therapeutic molecule to a New-Jersey based company, Nostrum Pharmaceuticals, to carry out animal trials. The drug has now entered the phase II of human trial, in which it will be given to 100 patients to study its effect and side-effects. "We are very close to making it available to the patients as the drug has proved effective on monkeys also. It has cleared the phase I of human trial," says Sahni. "If

everything goes well, it will be India's answer to tPA. It will be clot-specific and it could be given as a single shot and thus will not require any hospital stay. Besides, it will be affordable."

These scientists are working on a new drug, which will stay in the patient's body longer and will prevent the recurrence of clot, a common phenomenon in stroke patients. "This drug will be superior to the one in trial. In 60 per cent of stroke patients, there are chances that clots will show up again. The new drug will prevent it as it will stay in the blood lon-

ger," says Sahni.

But the journey has been long and arduous. "Around 70 people have worked on the project so far. Currently, 25 people are researching different aspects of streptokinase," says Sahni.

Pooja Beniwal Sawhney, 29, a PhD scholar, has been working on the project for the last five years. Her workstation has a poster that says stay positive. "It is very important, but difficult, for us to remain encouraged. In the beginning, when I used to initiate a new experiment, I often used to come to laboratory at odd hours to check the outcome of my trials. Sometimes, I used to stay till 2 a.m.," says Sawhney.

The group celebrate every small success with pakoras and jalebis and cheer each other up when they fail. "We are like a family," says Mohammad Rehan, a 28-year-old PhD scholar with the institute. "After all, we spend more time in the lab than at home." ●

The new drug will be clot-specific and it could be given as a single shot.

Dr Girish Sahni