SCIENTIFIC AMERICAN

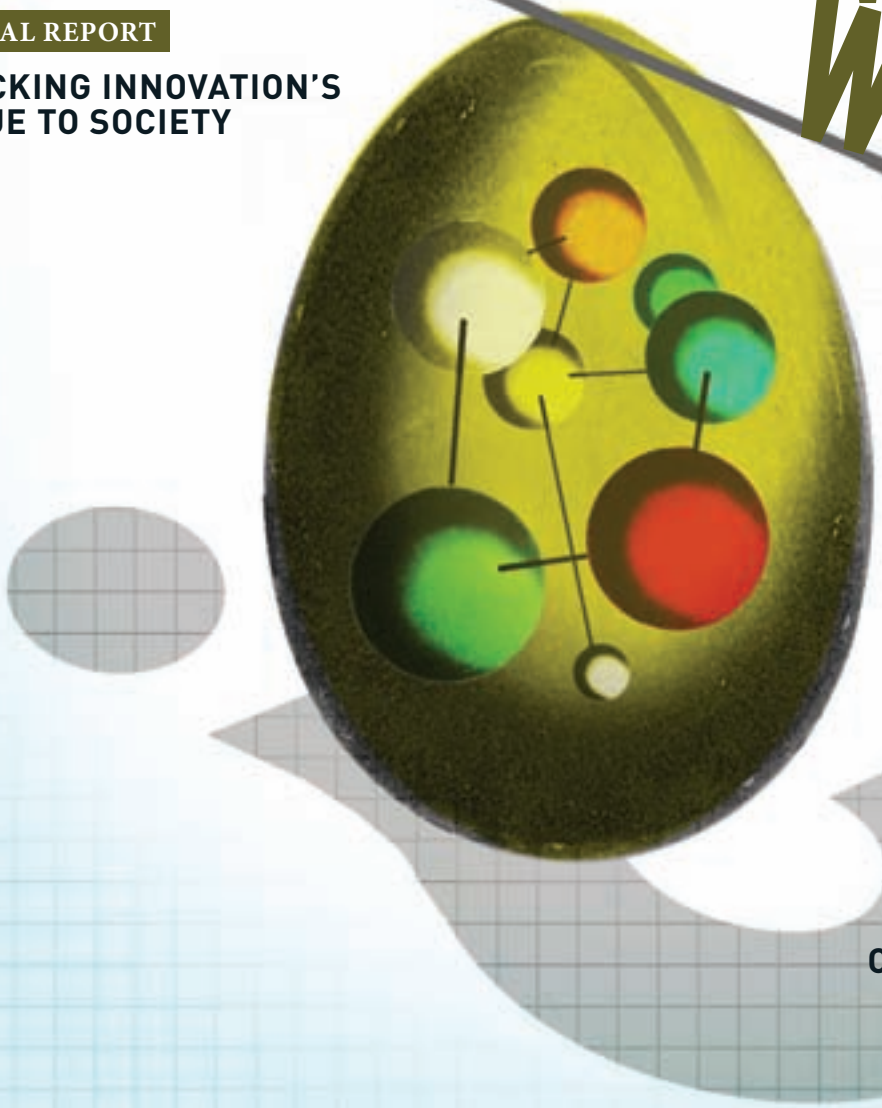
worldVIEW

A GLOBAL BIOTECHNOLOGY PERSPECTIVE

FOR WHAT IT'S WORTH

SPECIAL REPORT

TRACKING INNOVATION'S VALUE TO SOCIETY



+

THE 6TH ANNUAL WORLDVIEW SCORECARD
Confirming a recovery

TRANSFORMING CANCER CARE
Novel approaches spark a new dawn for all medicine

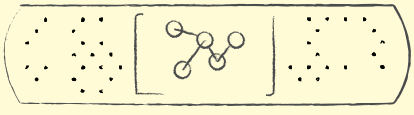
ON THE BEAT IN BRAZIL
Partnering its way to powerful solutions

cells," Revel says. "We want to take this further by finding treatments that stimulate the body to repair the myelin coating. Pluripotent stem cells are very useful for this."

While at Weizmann, Revel and his colleagues had already devised a procedure to differentiate human embryonic stem cells into myelin-forming oligodendrocytes very similar to those in the human brain. "We mimic these cells better than most, I think," he says. Now his team has worked out a robust protocol to produce these human myelinating cells and use them as a drug-screening platform, based on functional human tissue rather than on rodent cells.

Kadimastem, in contract with Merck Serono, is using these human myelin-forming cells to look for chemical compounds that fuel the differentiation of such cells. "We have semi–high throughput systems with robots that can handle compounds, and a computerized microscope to analyze images and quantify results," Revel says. "We have already found four classes of compounds that stimulate myelin formation."

On the regenerative medicine front, Kadimastem aims to improve diabetes treatment using insulin-producing cells derived from pluripotent stem cells. Designed for patients with types 1 and 2 diabetes who require daily insulin injections, this technique would involve implanting patients with the insulin-secreting cells to eliminate the need for injections. The challenge for Revel and his team is in getting the stem cells to mature into functional cells that sense the amount of glucose in the blood and secrete insulin accordingly. If they succeed, they plan to encapsulate these differentiated cells in a device that could be implanted, for example, beneath the skin. Their hope is that this will save patients from years of insulin injections.—SHAILAJA NEELAKANTAN



CURATIVE CUTUP

A new treatment that cuts down wound-healing time by cutting up bacteria's defenses

"This chap rang me up," recalls Simon Knapp, veterinary surgeon in Wokingham, UK, whose clients include horses belonging to Queen Elizabeth II. That call in 2012 came from Frank Sams-Dodd, who produces a wound-healing product called SertaSil. Thinking back on the call, Knapp recounts, "I said I would try it on a couple of horses to see how well it worked."

SertaSil consists of two ingredients, silica and an inflammation-reducing enzyme called serratiopeptidase. Where applied, it increases blood supply and controls infection. According to Knapp, SertaSil is a keeper.

At the moment, SertaSil, considered a medical device, is approved for use in animals in 13 countries. Ultimately, Sams-Dodd would like to see it approved for the human market, and is in the process of applying for the Conformité Européenne (CE) marking.

"We are launching on the veterinary market to get the case studies and the best use of the product," says Sams-Dodd. He and his wife, Jeanette, own Willingsford, which manufactures SertaSil.

Clinical data on SertaSil, as compared to the antibiotic gentaxane and an iodine-based antiseptic, showed patients using the product required significantly shorter hospital stays. The 266 study participants had various acute and chronic wounds: carbuncles, diabetic sores and injuries with necrosis and tissue penetration. Within just 1–5 days of applying the SertaSil, all of the wounds became "clean"—defined as free of dead tissue, pus and fibrinogenous thickenings. The comparative treatments took twice as long. Moreover, the study data show that SertaSil caused no adverse events.

SertaSil's story began in Ukraine, when three scientists—Olga Bilyayeva, Viacheslav Neshta and Alexander Golub—discovered a better product to heal wounds trapped by a biofilm, a protective environment that bacteria create to keep out the immune system. The researchers knew that silica could absorb moisture and other bacterial toxins, but when they added the enzyme, Sams-Dodd explains, "SertaSil cut up the biofilm," allowing the immune system to penetrate this barrier and attack the bacteria. "SertaSil isn't doing anything to the bacteria. It just exposes it." Sams-Dodd knew the researchers from a prior business relationship, and he and his wife bought the rights to SertaSil.

Willingsford, looking for angel and venture capital, found help in its own backyard—a roughly US$400,000 grant from the UK's Technology Strategy Board. Mark Glover, the board's strategy and planning director, says the organization was created to help innovative companies. Willingsford, which applied for the funding, received the product development money based on an expert healthcare panel recommendation. The National Health Service, Glover said, could use such a product.

As for Knapp, he appreciates both the speed and effectiveness this innovative treatment offers his patients, royal and otherwise: "Its simplicity is the beauty of it."

—CHRISTINE BAHLS