

PCT PORTRAITS

More than 1.2 million international patent applications covering new technology of every description have been filed since the Patent Cooperation Treaty (PCT) began operating in 1978. Continuing our series of snapshots, WIPO Magazine dips into the database of PCT applications and seeks out the people behind the patents. In this edition we find three very different inventions with medical applications

Nobel Prize for the Silence of the Genes

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The discovery by Craig Mello (left) and Andrew Fire was “like opening the blinds in the morning,” said a Nobel committee member.

At 4:40 am on October 2, 2006, Craig Mello in Massachusetts was going back to bed after checking his diabetic daughter’s blood sugar level when the phone rang. At a similar hour in California, Andrew Fire was woken by what he assumed was a wrong number call. The phone calls – from Sweden – informed the two scientists that they had been jointly awarded the 2006 Nobel Prize for Medicine.

In 1998 Dr. Craig Mello and Dr. Andrew Fire discovered a fundamental mechanism for controlling the flow of genetic information in living cells, solving a puzzle that had baffled scientists in different disciplines for years. They found a way to silence – or switch off – specific genes by disabling the gene’s “messenger” RNA molecules. RNA (ribonucleic acid) is similar to DNA, but more active and performs many of the cell’s more difficult

tasks, such as instructing a gene to produce a protein. It is by making proteins that an individual gene produces its effect. By silencing this effect, it is possible to identify the function of specific genes.

In the few years since they published their findings, RNA interference has become an essential research tool with multiple applications. In his interview for *Nobelprize.org*, Dr. Fire cited a study in Holland, “where they used RNA interference to characterize a given tumor type. Once they figured it out they said, ‘You could treat this with aspirin!’” Biomedics are also now using RNA interference to try to switch off disease-causing genes, with the aim of developing a new class of pharmaceuticals with the potential to treat diseases from diabetes and flu to AIDS and cancer.

Andrew Fire, who was working at the time for the Washington-based Carnegie Institution, and Craig Mello, at the University of Massachusetts Medical School, did their groundbreaking experiment in a tiny worm, the *C. ele-*

gans. They found they could block the effect of a specific gene by injecting worms with a double-stranded RNA. A friend and colleague of Andrew Fire’s, geneticist David Schwartz, recalls the hours of unglamorous labor that went into the research: “I’d be working in the middle of the night and Andy would be hunched over his microscope next door, feeding his worms. He had to push food their way with a tiny brush.”

Both scientists stress that they provided just one key piece of a jigsaw to which numerous researcher had contributed throughout the world. “Science is a group effort,” Andrew Fire told reporters.

Andrew Fire, Craig Mello and their research colleagues filed PCT applications in 1998 and 2000 for “genetic inhibition by double stranded RNA” and for “RNA interference pathway genes as tools for genetic interference.”

More information:
<http://nobelprize.org/>

Metal Magician Meets Engineering Wizard

A hypodermic needle so fine that it makes injections pain-free. This was the challenge proposed by the Tokyo-based medical equipment manufacturer, Terumo Corporation, with the goal of alleviating the daily discomfort of insulin injections for diabetic children. It was met by bringing together Terumo’s engineer, Tetsuya Oyauchi, who has a string of patents to his name for medical syringes, and Masayuki Okano, the 73-year old head of a small metal pressing factory.

The usual method of manufacturing needles is to hollow out a tiny cylinder of metal. But the thinner the cylinder, the more difficult this procedure becomes. Terumo Corporation’s quest for an ultra-thin needle had been turned down as impracticable by a string of large metalwork firms, before they turned to Mr. Okano, whose skilled craftsmanship, *Web Japan* reports, had earned him a reputation as a metalwork magician.