HEALTH

Israeli scientist targets the building blocks of Alzheimer's

By Ilana Teitelbaum October 21, 2007

German company Merz Pharmaceuticals, a leading international player in the area of Alzheimer's disease research and treatment, knows when a new drug technology has potential. The company has already developed Memantine, a blockbuster anti-dementia drug that earns the company $1 billion a year in sales.

So, it was a loud vote of confidence in Israeli scientist Professor Ehud Gazit of Tel Aviv University when Merz recently licensed his potentially groundbreaking new drug technology for the treatment of Alzheimer's disease.
The drug company's screening process is rigorous and intensely selective, including a round of conference calls and a trip by Gazit and his team of researchers to Germany to be questioned about the technology firsthand.

"The reason I believe they chose Gazit's technology is that they think it is unique, and also because they believe strongly in the scientist," said Ze'ev Weinfeld, executive vice president of business development for Ramot, TAU's technology transfer company which licensed Gazit's technology to Merz. "It was the combination of the technology and the scientist that made it attractive."

The Alzheimer's Association has estimated that the devastating neurodegenerative disease affects 4.5 million Americans and 15 million people worldwide, a number which is expected to triple by 2050 as a result of increased life expectancy in the developed world.
Alzheimer's disease is caused when toxic protein deposits comprised of amyloid fibers form in the brain, leading to the deterioration of the surrounding cells and tissue. In the case of Alzheimer's, these protein deposits, or fibers, form in the areas of the brain that control memory and cognition, thereby impairing those functions.

Gazit, who is a member of the Stephen S. Wise Faculty of Life Sciences, told ISRAEL21c that he and his research team have been working for six years on identifying the most basic components of the molecules that comprise the amyloid fibers that cause Alzheimer's disease. Their goal is to develop a technology, and ultimately a drug, that will inhibit the fibers' assembly and even reverse the damage that the fibers have caused.

"I play with molecules," Gazit comments jokingly and with clear enthusiasm. Such a focus on the molecular components of matter places Gazit's approach squarely in the scientific field of nanotechnology, which is concerned with studying matter on a molecular level and in the smallest possible measures (*nano* means "dwarf" in Greek). Since molecular assembly takes place in a wide variety of circumstances, nanotechnology is a highly multi-disciplinary field which combines different forms of scientific research and technology.

"We were able to identify the very basic and smallest elements involved in the formation of these structures," Gazit explained. "We discovered pentapeptide, which forms the amyloid fibers."

The benefit of this discovery, Gazit goes on to illustrate, is that by understanding the very basic processes that lead to the formation of amyloid fibers, "you come to a system that is easy to manipulate. Instead of dealing with large proteins we have a simpler element to study and can change it in a delicate way. One of the unique things about our work is that we know intimately how these processes occur."

To illustrate the scale of the elements that he deals with, Gazit gives an example, "If you have a sphere of about seven nanometers, the ratio between this sphere and a soccer ball is like the ratio between the soccer ball and earth."

Gazit points out that the process which leads to Alzheimer's disease - a toxic formation of proteins - is the same process that is responsible for other degenerative diseases, such as diabetes and Parkinson's disease.

"The mechanism of Type II diabetes and Alzheimer's disease seem completely different, but on nanoscopic scale, there's a formation of fibers in both cases," he said.

The type of disease depends on the area of the body where the amyloid fibers are formed - if the fibers develop in the pancreas, the consequential disease is diabetes. If they develop in the areas of the brain that control motor functions, the result is Parkinson's disease. Consequently, Gazit is working on applying his research to the treatment of diabetes and Parkinson's.

Gazit is also interested in diagnostics, and in applying the processes he has discovered to the early detection of Alzheimer's. "With neurodegenerative diseases you need a way to detect what's going on in the brain," explains Gazit. "Also, if you develop a drug, you want to follow its progress."

Gazit is not alone in his optimism that he's on the right path of gaining insight into early detection of Alzheimer's. According to Professor Zvi Galil, president of TAU, "we believe that our cooperation with Merz Pharmaceuticals will lead to the development of long sought-after effective treatments for some of the most devastating illnesses known to date."