

Two "promising young" UCSD scientists named Sloan Fellows

May 15, 1998

Media Contact: Warren R. Froelich, (619) 534-8564, wfroelic@ucsd.edu

TWO "PROMISING YOUNG" UCSD SCIENTISTS NAMED SLOAN FELLOWS

Two young scientists at the University of California, San Diego, Patricia Jennings, assistant professor of chemistry and biochemistry, and Yukiko Goda, assistant professor of biology--have been selected this year as Alfred P. Sloan Fellows.

Each year, the Sloan Foundation awards 100 fellowships to young scholars who show "outstanding research promise" in physics, chemistry, mathematics, neuroscience, economics, and computer science.

The award includes a two-year, \$35,000 unrestricted grant that can be used in support of the Fellow's research.

In her case, Jennings is working on what researchers refer to as the "protein folding problem" or how do proteins ultimately take their final shape?

Those who work in the field know the problem is anything but simple. To many, it's akin to solving a three-dimensional jigsaw puzzle that's bouncing around on a series of vibrating slinkies.

The puzzle begins with beads on a string known as amino acids. The order of amino acids along the string, the primary structure, is known, but what's missing is how each bead relates to the others in three-dimensional space.

The amino acids align themselves along an imaginary axis to form secondary structures known as alpha helices and ribbon-like beta-pleated sheets that fold upon themselves to form a final three-dimensional or tertiary shape.

This shape is constantly being pushed and jostled by various forces, bonds and electronic charges. The protein wobbles and vibrates like a bouncing bowl of jello, even when it is at rest.

Protein folding is more than an intellectual exercise. If the laws that govern protein folding could be revealed, it would be a major step toward the rational design of antibodies, enzymes, and other chemicals that might help the body improve immunity or cure disease. Alzheimer's disease and prion-related diseases such as mad cow disease are characterized by defects in protein folding pathways that lead to precipitation of protein in the brain.

"It is an exciting time to be investigating protein folding," said Jennings, the recipient of the Hellman Fellowship, as well as two NIH research awards. "I believe our research will lead to new insights into this pressing problem."

In her lab, Jennings is using a combination of sophisticated imaging tools, including nuclear magnetic resonance (NMR) techniques, to study proteins as they bob and weave during folding and what biochemical activities influence or guide that process.

"The combination of skills learned in my laboratory provide a strong background in both the theoretical and experimental aspects of protein structure, dynamics and folding," she said.

Yukiko Goda, who joined the UCSD biology department in 1997, is conducting research on the synapse, the narrow cleft between neurons in the brain where information from one cell is passed to another. This activity involves a series of tightly orchestrated events involving the release of chemical messages called neurotransmitters and the activation of the recipient nerve cell when the messengers complete their journey across the synapse.

Curiously, the effectiveness of this multi-step communication which takes place in less than a millisecond depends on how often the synapses are activated. Indeed, the old adage of "practice makes perfect" seems appropriate here; the repeated use of synapses actually improves their information transfer capabilities, with the effect lasting up to several days.

In her lab, Goda is working to understand specific activities within brain cells that regulate the efficiency of this trans-synaptic activity.

"It is hoped that our research will provide a better understanding of cognitive processes requiring controlled changes in the connectivity between neurons such as learning and memory," she said.

Goda already has received several major research honors, including the National Alliance for Research on Schizophrenia and Depression Young Investigator Award in 1994.

Established in 1955, the Sloan Foundation has spent near \$76 million in support of more than 3,200 young researchers. Many of the winners have garnered hundreds of research honors during their careers, including 21 Nobel Prizes.

(May 15, 1998)