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I always felt that science is

the walk of life in which I

can make best use of my

two for one deal!"

personal capabilities.

- Mihály (Stoci) Kovács

Biophysicist in Profile

MIHÁLY (STOCI) KOVÁCS

Mihály Kovács, known to his friends and colleagues as Stoci, started his career with a fascination for molecular genetics, leading to the cloning of motor protein genes and then the biochemical and biophysical examination of these enzymes. The "universal perspective" of biophysics, as he puts it, was so interesting he decided to make a career out of it. Following a disciplined Catholic education in Kecskemét, Hungary, Kovács went on to earn his Master of Science degree in biology at Eötvös Loránd University in Budapest.

He continued his PhD studies at Eötvös Loránd University, working with László Nyitray and András Málnási-Csizmadia, both of whom

proved to be invaluable contacts in moving his career forward. While pursuing his PhD, Kovács had the opportunity to visit the lab of *Clive Bagshaw* (whom he met through Málnási-Csizmadia) at the University of Leicester, United Kingdom, as a student, funded by Hungarian State and EMBO Fellowships. During his stay in the UK, Kovács learned state-of-the-art techniques of motor protein biochemistry, and helped to engineer, prepare and

characterize myosin motor domains from the model

organism *Dictyostelium*. "In particular," Bagshaw explained, "he introduced single tryptophan residues near the ATPase site, allowing us to correlate ATP binding kinetics with structural changes predicted by x-ray crystallography."

Upon completion of his PhD, Kovács' advisor Nyitray would connect him to the next step in his career, introducing him to *James Sellers* at a European Muscle Conference. "He was the first Hungarian to work in my lab," Sellers said, "and I've had at least one in my lab ever since!" After welcoming Kovács into his NIH lab, Sellers found out that "he had this girlfriend who was just starting her PhD in France, and that they would really like to be together," Sellers explained. Kovács asked, "was there any way we could get her to NIH?" Apparently the luckiest man in science, the National Institutes of Health (NIH) had recently begun allowing researchers to hire foreign graduate students, and Sellers hired Kovács' then-girlfriend and now-wife, *Judit Tóth*, in what he described as a "great

Postdoctoral training with Sellers at the National Heart, Lung and Blood Institute allowed Kovács to take the myosin ATPase project from his PhD with Bagshaw forward. Working with Sellers, "I acquired additional technical know-how in the biophysical examination of motor proteins," said Kovács, something he has

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continued working on after returning to Eötvös Loránd University as an independent researcher at the early age of 30.

Kovács has continued his pursuit of research related to myosin motor proteins involved in cytokinesis and intracellular transport. In a recently initiated new line of research, he has been involved in finding out how DNA helicases belonging to the ubiquitous RecQ family can specifically unwind and rearrange DNA structures. The DNA molecules processed by these enzymes are key intermediates of homologous recombinationbased DNA repair. "We have devised and utilized biophysical methods by which we are able to determine all key functional properties of these enzymes," he explained. "We have elucidated the mechanism of translocation of E. coli RecQ and human Bloom's syndrome (BLM) helicases along single-stranded DNA." His lab has discovered that the winged helix domain plays a more fine-tuned role in BLM than in other family members, aiding the precise and coordinated unwinding of complex DNA structures. Additionally, Kovács' team has found that the oligomerization state of BLM is affected by the structure of the DNA substrate encountered, a finding that has bearings on the mechanism of processing DNA structures during recombination. The DNA helicase project has recently obtained support of the prestigious Momentum program of the Hungarian Academy of Sciences.

Running his own lab (www.mk-lab.org) has been rewarding for Kovács, allowing him to not only find intellectual satisfaction in the "perpetually interesting task of hunting out and solving relevant problems," but in helping develop the careers of others. "I regard fostering other people's careers just as important as the scientific achievements themselves," said Kovács. "I am proud that several of my former students and group members have successfully furthered their careers in leading labs of the world." As rewarding as it may be to assist his colleagues, Kovács has not always found it easy to find those great colleagues to help. "Of course the biggest challenge is getting manuscripts past the editorial screens at high-profile journals," he said, "but more specifically, it can be difficult to attract highly skilled and motivated postdoctoral researchers to Central Europe."

Geographic difficulties aside, Kovács has set up many important collaborations at Biophysical Society Annual Meetings. "At one Meeting, I learned about the fascinating findings of my former NIH coworkers Xuefei Ma and Bob Adelstein on the role of non-muscle myosin II in cytokinesis," he said. "Later, we combined their cell biological results with my lab's biophysical results, which resulted in a recent paper." The paper in question, Kovács mentions, may just be "one of the most important ones during my career." The Annual Meetings also provide a great opportunity for Kovács to keep in touch with Keir Neuman of the NIH, with whom he runs a joint project funded by the Human Frontier Science Program (HFSP).

Throughout his career, Kovács has been inspired by his mentors, co-workers, and his wife, who is also a biophysicist. "I admire her for continuing to mentor students and write papers and grant applications through her pregnancy and the first few months after the birth of our son, while of course dedicating her attention to our baby," said Kovács. A rock band drummer in years past, career and family has limited his practice time. Kovács spends most of his spare time with his young family, and is expecting another son later this year.

Kovács will be at the 2013 Annual Meeting, co-chairing the Motility subgroup with Chris Yengo, Pennsylvania State University. His advice to young researchers is to "be brave enough to do research on whatever truly fascinates you, and be mobile, try different places and look for the mentor who suits you best."



Mihály Kovács with his wife, Judit Tóth, and their son, Géza.