In Conversation:
Research Fellow Joanna Sztuba-Solinska, Ph.D.

CCR: What drew you to the study of viral genomes?
Joanna: The influence of emerging pathogens like severe acute respiratory syndrome (SARS) and Ebola on global health has interested me since I was a student in Poland. At a molecular level, I am fascinated by viral resiliency and plasticity. When I came to the U.S. almost 10 years ago as a graduate student, I studied the mechanisms of RNA recombination that occur in plant RNA viruses to understand how they evolve and adjust to an ever-changing environment.


(Photo: R. Frederickson)

Joanna Sztuba-Solinska, Ph.D.

CCR: How did you come to work with Stuart LeGrice, Ph.D., Senior Investigator in CCR's Basic Research Laboratory?
Joanna: I came to the NIH in 2011 to work with Stuart because he was moving into a new field of probing RNA structural motifs in viruses. I knew that there was more to RNA than just sequence; structure had to fulfill different roles in the viral lifecycle. My very first publication in Stuart's laboratory was on Dengue virus RNA. The full genome is 11kb long, making it difficult to work with. So we use a "minigenome," which contains all essential RNA motifs that support the viral life cycle. Using a variety of biochemical probing and mutagenesis techniques, I found evidence of a tertiary RNA–RNA interaction called an H-type pseudoknot that can form transiently, like a switch that may allow the virus to use the same RNA as a template for replication or a template for translation.

CCR: How can such information be used to combat viral infections?
Joanna: The global view is to characterize structures of RNA and connect them to functions, but to also target RNA motifs with small molecules. I believe this could be a very effective way of developing new and hopefully very potent therapeutics against viruses. In fact, working with Jay Schneekloth's group in CCR's Chemical Biology Laboratory, we have been developing a method to look for RNA-specific small-molecule binders with the use of small molecule microarrays. We have already successfully applied this unique strategy to target the HIV transactivation response (TAR) hairpin.

CCR: Are collaborations important in your research?
Joanna: Definitely. I have several projects—two to three main ones at any time and then some side projects, all highly collaborative. We have a lot of meetings with people of similar interest; that's how the Dengue project began, which was a collaboration with researchers at Georgetown University Medical Center. Currently, I have collaborative projects on the Dengue virus, Ebola virus, and on the Kaposi sarcoma herpesvirus, which is a cancer-causing virus.

CCR: With so much work, how do you achieve a life balance?
Joanna: I am the mother of a 20-month-old child. My husband is a huge help—without family support, it wouldn't be possible. My daughter keeps me grounded and gives me joy after work.

CCR: What advice would you give to other NIH fellows?
Joanna: Interact with a lot of people, and discuss your ideas with your peers, principal investigators, your mentor, and your friends. Also, take some time off and be involved in different courses that NCI or NIH offers. I recently participated in a grant-writing workshop, which I believe will be very useful for me as I think about applying for academic positions. I also took a workshop on scientific management training and participated in a videocast course on translational research in clinical oncology. Don't stay closed in your lab; take advantage of opportunities.