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My name is Gerhard Mundinger, and I have always gone by 'Sol,' a shortening of my middle name. I participated in the Clinical Research Training Program (CRTP) in 2005-2006. I am originally from Madison, MS, and earned B.S. degrees from the University of Michigan in Biology, Environmental Policy, and Ecology and Natural Resource Management. I started medical school at Johns Hopkins in 2002.

I first learned about CRTP through a medical school classmate of mine who participated in the program in 2004-2005. I was searching for year-long research opportunities for medical students at the time and was very impressed by the program's offerings as well as the strength of the research community at the National Institutes of Health (NIH).

My CRTP project focused on assessing tumor and surrounding host-organ tissue protein signaling cascade alterations in response to surgically delivered chemotherapy and correlating these signaling aberrations with clinical response to treatment. The project was a joint collaboration between the National Cancer Institute's Surgery Branch and the Laboratory of Pathology, with Dr. H. Richard Alexander and Dr. Elaine Jaffe as respective principal investigators. I utilized reverse phase protein microarray (RPMA), an emerging technology, to assess tumor and host-organ protein signaling responses to high-dose melphalan delivered during isolated hepatic perfusion surgery for patients with metastatic disease confined to the liver. RPMA allows for real-time protein network interrogation in high-throughput and parallel fashion through the use of sophisticated robotic arrayers and isoform specific antibodies. I also evaluated protein signaling responses to cisplatin delivered during continuous hyperthemic peritoneal perfusion surgery for patients with advanced abdominal cancers, mainly peritoneal mesothelioma. As cell lines were grown from patients undergoing the latter procedure, I was also able to model operative conditions in vitro and assess the potential utility of tyrosine kinase inhibitors in combined modality treatment with cisplatin for peritoneal mesothelioma. I came to the NIH with the intent of working on a translational oncology project in the

Surgery Branch and was most interested in this specific project because of the ability to work with an emerging technology platform and its interdisciplinary nature.

I have been interested in surgery since I was a teenager, and became interested in oncology during medical school for a number of reasons. Foremost, cancer remains a great frontier in medicine, both in terms of the staggering toll it continues to levy on humanity and in terms of novel research efforts aiming to reduce its substantial morbidity and mortality. Recently, discussion of oncogenesis, invasion, metastasis, and treatment of established tumors has been framed in principles similar to those I was intrigued by as an undergraduate in ecology: cancer is being increasingly evaluated in the context of the tumor-host microenvironment, and treatment paradigms are shifting toward combinatorial therapies in the hope of improving efficacy/toxicity ratios and reducing selection pressure for developing resistance to treatment modalities.

For me, a typical day at NIH involved work with biopsy samples in the mornings in the Laboratory of Pathology, followed by cell culture experimentation in the afternoons in the Surgery Branch. I performed intraoperative specimen procurements and had ample opportunity to scrub on cases both related and unrelated to my project throughout the year. I also worked to establish patient-derived cell lines in mice, spending time in the animal holding rooms as necessary. Laboratory meetings and journal clubs were scattered throughout the week. Multidisciplinary surgery conferences involving radiology, radiation oncology, pathology, and infectious disease were held on Monday afternoons and Friday mornings. Surgical research 'teas,' where research fellows and staff scientists present their individual work, were held on Thursday afternoons. I also kept an eye out for interesting lectures and symposia unrelated to my project taking place at NIH, of which there were many throughout the year, given by invited experts in their respective fields.

My year at NIH was invaluable in terms of developing and broadening my research interests. Aside from learning how to better articulate as well as formulate approaches to answering research questions, I was consistently stimulated and engaged by the community at NIH, which left me with a broader appreciation and understanding of areas of inquiry vastly different than my own. Even within my own project, every week it seemed like there were new potential avenues to explore that came up in discussions with principal investigators, residents, labmates, and other CRTP members. Drs. Jaffe and Alexander treated me as a colleague, and established a very congenial and open rapport, which I think is central to an effective mentor-protégé relationship. I felt that I was given enough space to pursue my project in an independent fashion but with adequate oversight so as not to inevitably 'dig a hole' from which I couldn't climb out. The oversight and direction provided by my principal investigators and residents were all the more crucial given the year-long program timeframe. Weekly discussions with my tutor, Dr. David Harlan, provided important perspectives on my project from a seasoned researcher with expertise in another field. I was able to present my findings in a variety of formats throughout the year and attended the American Association for Cancer Research (AACR) and American Society of Clinical Oncology (ASCO) national conferences, two of the biggest oncological conferences in the world, through funds made available by my lab

and the CRTP. CRTP also funded travel to the national American Medical Student Association (AMSA) meeting and the Surgery Branch sponsored an oral presentation at the National Cancer Institute's annual Young Investigator's Retreat. Participating in CRTP has solidified my resolve to make academic research a foundational component of my career and has opened doors that I hope will help make this a reality.

At the conclusion of the CRTP year, I will return to finish my 4th year of medical school and apply for a surgical residency position. My long term career goals include teaching, researching, and operating at a high-volume academic surgical center, preferentially in an area with an active outdoor community. I would certainly consider returning to NIH for further research as a research fellow during or immediately after residency, and hope to come back to NIH during my 4th year of medical school to finish up my project work.

During my free time as a CRTP fellow, I caught up with high school and college friends living in the area, enjoyed the seemingly endless offerings of an easily accessible world-class city, explored Bethesda restaurants, caught up on free-reading, devoted more time to playing guitar, joined an indoor soccer team, played pick-up ultimate Frisbee twice a week on the NIH south lawn, trained for an off-road triathlon, took Japanese language courses, and promoted a volunteer clinic (Sal y Luz) that I have been involved with in the Lago de Yojoa region of Honduras.

Dr. Steven Rosenberg, Chief of the Surgery Branch, is fond of telling incoming students 'The opportunities at the NIH are extraordinary. You are only limited by the quality of your ideas and how hard you are willing to work.' As my time as a CRTP fellow at NIH draws to a close, these words could not ring more true. I am grateful to the CRTP for allowing me this time to explore these opportunities to the fullest extent possible.