DIALOGUE WITH OUR GENES – MY YEAR AT WIKO

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I am a research scientist, working as a Professor at the Department of Molecular Genetics at the Weizmann Institute, Israel. As a post doc at MIT, Cambridge, I worked on the isolation of human cancer genes and made the startling discovery that these genes have been conserved in the course of evolution and can be found in fruit fly and worm genomes. In 1981, I opened my independent lab at the Weizmann Institute of Science. My research focuses on the use of the awesome power of fruit fly genetics in order to elucidate the normal roles of these cancer-causing genes and the circuitry that triggers them. We have found that these genes encode proteins mediating communication between cells, primarily during the course of embryonic development. The cells are initially multipotent and assume their unique fate and structure only after receiving and sending information to their neighbors. Furthermore, these genes play a similar role in a wide range of organisms, carrying out functions that probably existed already in the ancestral multicellular organism over 600 million years ago. In addition to my research efforts, I also participated throughout the years in administrative duties at the Weizmann Institute as department head and dean. – Address: Weizmann Institute of Science, Arthur and Rochelle Belfer Building for Biomedical Research, Rehovot 76100, Israel. E-mail: benny.shilo@weizmann.ac.il.

At Wiko I have embarked upon a new project: the evolutionary conservation of genes that play a central role in cell communication implies that they have indispensable functions. However, it also suggests that more subtle alterations in their regulation may lead to abnormal, pathological consequences. Indeed, over 50% of the genes implicated in human disease can be found also in the fruit fly genome. I wanted to make the leap from the

laboratory realm and fruit fly studies to issues relevant to human disease. I was fortunate to meet an MD, the genetic counselor Dr. Ehud Banne. In our discussions it became clear that our views on genetics are highly complementary. He is seeing patients and looking for the best ways to trace the genetic basis of their defects in order to come up with possible solutions to their problems and those of additional siblings that will be born. I focus on the mechanistic basis for defects that are caused by alterations in these genes and how they affect their holders' development and physiology.

With the advent of cheap and accessible genome sequencing, it is currently much easier to identify the genetic causes of human disease. Thus, genetic counseling is having a major impact on human health by offering, in many cases, several alternative solutions. The decision on which track to follow, e.g. an amniocentesis test followed by a possible abortion vs. in vitro fertilization and embryo transplantation, depends on the cultural background and personal preferences of the family. In other words, these are decisions that must be made not only by the doctors; the families need to take an active role. In the broad public, there is very limited knowledge of the ethical and scientific basis of genetic counseling, and thus it is difficult for patients to make informed decisions. A popular book that will present these topics can fill the gap.

Dr. Banne and I are writing a book on genetic counseling that is based on case studies stories. It presents the different advanced technologies that are available to track genetic defects and possible solutions that follow the test results. The book provides a popular explanation for the underlying scientific basis, as well as elaboration on ethical issues that must be considered.

During my year at Wiko, we have greatly advanced in writing the book. Dr. Banne provided the case studies, and I wrote the scientific background for each chapter. We had many discussions on the way we would like to present the material so that it will be accessible to a broad public and yet sufficiently detailed and sophisticated to provide the essence of the exciting scientific background behind it. The book will have 23 chapters, like the number of human chromosome pairs; we have 6 more "chromosome pairs" to go in order to complete it.

The year at Wiko was such a novel and multifaceted experience that it is difficult to decide where to begin. In a nutshell, it was a perfect combination of continuous social interactions that were carried out in a stimulating academic background. It is important for me to place the experience in this order, to emphasize the pleasant environment in which the academic interactions were carried out. Each of the Fellows was in a setting that is

very different from the conventional situation of meeting colleagues in related fields. Thus, the whole issue of competition or "showing off" becomes irrelevant. At Wiko, you are among people who will appreciate you for your social skills, curiosity, and general intellectual capabilities, but not for your achievements in your specific field of research. It is so refreshing to be among such people, where lunch conversations can range anywhere from the history of art in China, through the composition of music for modern operas, to the evolutionary origin of cells. The Tuesday Colloquium, where each Fellow presented the essence of their field and their own contributions to that field, was the highlight of the week.

Expanding the gaze beyond the company at the lunch table, Wiko at large was amazing. The continuous input and interest from the Rector and her assistants were not only stimulating, but also made sure we progressed through the year on the right track. The dedication and devotion of the staff to every need was such a treat. Finally, the physical setting was amazing. Walking every day from Villa Walther along the lake to Wiko, I had to pinch myself to verify that this beautiful scenery is real. Not only was it real, but also constantly changing during the seasons. Following the life cycle of the swans during the year and meeting the friendly and curious fox on several occasions was thrilling. Finally, there was Berlin at large, with the list of countless cultural experiences it offers. Seeing the different ways in which each Fellow discovered the city and benefiting from the shared experiences was an important aspect of the year and a major discussion topic.

I am sure that every year at Wiko is very different, depending on the topics and personalities of the year's Fellows. Indeed, it was clear how much effort is dedicated to the selection of the new Fellows, with an attempt to evaluate not only their intellectual capacity, but also their curiosity and openness to new fields and experiences. The addition of young Fellows in the College for Life Sciences was extremely important and influential. It expanded the age range of Fellows with young and enthusiastic upcoming scientists, who demonstrated an impressive maturity and ability to benefit from the unique environment at Wiko.

In conclusion, a year at Wiko is a once in a lifetime gift. An opportunity to be in a new and welcoming environment, to be open to new experiences and eventually return to your "regular life" not only with extremely pleasant memories and new friendships, but also with a novel perspective. My wife, Varda, and I are extremely grateful for the unique experience at Wiko.