As the doors to the foyer of the MRC Laboratory of Molecular Biology slide open, photos of the LMB’s thirteen Nobel Prize-winners greet visitors. One of these faces is likely to reappear in its real-life incarnation as they roam the Lab’s corridors. Sir Aaron Klug, who won the Nobel Prize for Chemistry in 1982, and has served as Director of the LMB and President of the Royal Society, is now 82 years old, yet he continues his career at the LMB.

Aaron Klug won his Nobel Prize for developing a type of microscopy that can determine the detailed structures of protein and nucleic acid complexes. Electron microscopy, which was pioneered in 1931, can magnify specimens 1000 times more than traditional light microscopes. Until Klug’s work, however, electron microscopes could resolve only 2-D images. Klug created 3-D reconstructions from electron micrographs by taking images from many different angles and putting them together in a computer. He used this technique to work out the structures of a number of viruses, and of the ‘nucleosome core’, the basic building block necessary to package DNA into chromosomes.

Aaron Klug’s work is particularly extraordinary because it is so varied. In addition to the nucleosome and viruses, Klug established the structure of tRNA, an essential molecule for constructing proteins, and of the zinc finger domain, an important feature of many proteins that bind DNA. The wide-ranging influence of Klug’s work is evidence of his creativity and curiosity, but it would not have been possible without the freedom to explore the problems he found most interesting. Many modern researchers must apply for grants to pursue their work, which means they must follow projects that funding bodies find interesting. LMB researchers are funded by the MRC, and the Lab is grounded on the principle that if imaginative people are given the tools to study what they wish, success will follow.

The freethinking atmosphere at the LMB also lends itself to the sharing of ideas and expertise. Many talented scientists worked alongside Aaron Klug, and some are famous in their own right: Roger Kornberg, winner of the 2006 Nobel Prize for Chemistry, worked with Klug on the nucleosome, and Francis Crick collaborated on tRNA. Informal discussion and exchange of ideas between LMB scientists has always been important for their work, and Klug’s influence on his colleagues remains evident even today.

But Aaron Klug’s influence is not confined to the LMB. Whereas much biological research has a direct application to medicine, the LMB supports long-term work on basic science, in the expectation that it will eventually yield results in medicine. Aaron Klug’s work is a perfect example; his 3-D techniques led to the development of CT scans, which doctors use to take detailed images of the human body, an outcome he could not have foreseen when he was pursuing the structure of viruses. More recently, he has developed a gene therapy technique that targets and silences genes that are mutated in disease using zinc finger proteins. Phase-2 trials of a drug using this began in September of this year.

His 3-D techniques led to the development of CT scans

Although Klug’s accomplishments could provide enough material for this entire journal, his career also demonstrates some of the factors underlying the LMB’s success—the collaboration of intelligent, curious scientists with unique expertise, and the freedom they are given to pursue their passion. Through such approaches, it provides brilliant researchers with the environment that they need to work best. Indeed, when a British newspaper described the LMB as a “Nobel Prize factory”, Klug himself objected that the term should be “plantation” [1].

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References: