Movies Essay, Research Paper

In The Double Helix, a reader can find James D. Watson’s first hand accounts of the competitive race in science that led to the discovery of the structure of the DNA molecule. The DNA research Watson and his colleagues took part in demanded knowledge in many areas of expertise, but the most important area was that of X-ray analysis. By creating photographic two dimensional pictures of the three dimensional DNA molecule, Watson and his team were able to analyze these pictures and determine that DNA is actually shaped as a double helix structure. This discovery proved to be a true scientific breakthrough, ultimately winning Watson a nobel prize in 1962.

The title “The Double Helix” refers to the complex structure of DNA, however, the book is not a technical work. The book functions as a scientist’s journal about a part of his life and work leading up to his greatest achievement and its impact. Watson’s story starts from the fall of 1951 when he arrives at the Cavendish Laboratory of Cambridge University, and ends with the publication proposing a brilliant new structure for DNA in April of 1953. Watson originally begins working with a group studying the three-dimensional structure of proteins. Then slowly he and Crick team up to investigate the structure of DNA. Two scholars from Oxford, Maurice Wilkins and Rosy Franklin, as well as Linus Pauling from the United States were all independently studying DNA structure. Toward the end of the story, the book turns into a competitive race to find the true structure of the mysterious molecule. Each scientist knows that there are phosphates, sugars, and bases involved and there are four types of nucleotides. The scientists also suspect that the molecule is in some sort of helix formation. Watson and his team are most motivated by the fact that renowned chemist Linus Pauling is also attempting the problem. Watson and Crick have the upper hand, however, since they have the work of Rosalind Franklin and Maurice Wilkins. The X-ray chromatography these two generate give Watson and Crick the integral information to be able to reveal the helical structure of DNA.

This discovery would not have been possible without the use of X-ray analysis, nor would i have been able to understand how they used X-ray analysis if i had not studied it in the c1403 book, and heard about X-rays in class lecture. The scientists were using these short wavelength rays, with high penetration levels to create images of the extremely small crystalline DNA structures. Wilhelm Rontgen discovered X-rays in 1895, and then seventeen years later Max von Laue realized that aiming these rays at a salt crystal could create a spotted image on a photographic plate. Later the father and son duo of W.H. and W.L. Bragg developed a way to analyze this image. The DNA molecule was too small to look at with a microscope, and this methodology of crystallizing the DNA and shooting X-rays through it was the only way to get a visual of what the stucture might look like. Franklin and Wilkins used this process of “X-ray crystallography” to provide Watson’s team with two dimensional pictures of the DNA. Watson and Crick used Watson’s earlier notion of how the base pairs bonded, along with these visual images generated by Rosalind to realize that the double helix is a sort of backbone for the DNA molecule, and the bonded bases sit neatly within this helical ribcage. Once the team could tell the structure was a double helix, it was easy to put together the rest of the puzzle since they already had the basic three dimensional blue print of their project. Watson and Crick owe much of their acclaim to Rosalind Franklin and her X-ray techniques. Without the images developed through X-ray crystallography, Watson and Crick would never have been able to unravel the mystery of the structure of DNA.sd

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