The Double Helix Essay, Research Paper

After reading The Double Helix by James B. Watson, I have learned that the double helix structure of DNA is the source of the genetic code that determines the traits passed along from one living generation to the next. In deciding which of the critical elements in the process of discovering the structure of DNA was most surprising would be how X-rays might be diffracted by a helical molecule. Although Watson was very open about his ignorance of X-ray crystallographic techniques, X-ray diffraction was one of the key elements that was repeatedly discussed and consequently aided the discovery of the DNA structure.

The seminar on DNA by Franklin is an important part of the book because it illustrates how critical her thinking was in developing the double helix model. Furthermore, Watson mentions something about the water content (p.52) of the DNA samples. He thought that this was an important element in getting good diffraction pictures of DNA. Remember that living cells are mostly water, and therefore DNA interacts with water all the time. Franklin suspected; correctly as it turned out, that DNA samples would have to have a high water content in order to have the same structure that they did in living cells. If too much water is taken out in an effort to make the samples crystalline, DNA interacts with itself and the structure changes.

Note that in chapter 11, Watson and Crick wonder about how many strands might be in the helix. We have already learned that the diameter of the DNA was wider than one would expect for a single polynucleotide strand. The number of strands could only be determined by knowing the angles at which the helix appeared zig-zag. For instance, if there are 4 strands, then the individual strands should be nearly parallel to the long axis of the fiber. If there are only 2, the angle should be much sharper. This is why getting a good X-ray pattern that showed the angle clearly would be of great importance.

Although Franklin argues how the anti-helical features of the DNA X-ray pattern applied to only a structure known as an A-form of DNA that had very little water. Watson mentions on page 107 that the B-form is clearly helical, and as a result, the double helix model was derived from the B-form data. Franklin s contributions to the model are providing critical X-ray data and insisting that the bases be placed at the centre of the structure. Her immediate acceptance of the double helix model (p. 134) contrasts sharply with Watson s assertion that she had been anti-helical up to that point.