

*DNA Structure and Replication: In the textbook, there is a picture showing two different views on how DNA can replicate. There is one that resembles what we have discussed in class, where the replication complexes move away from the ori; and there is a second view where the DNA is threaded through the complexes. The book says the second is the correct model, but this is not what seems to have been portrayed in the lectures. Can you explain which is the correct model and why?*

That's a great question. Let me start my answer first by assuring you that I won't ask a question about the difference between the two models on an exam, since we didn't discuss the "second" model. Now let's continue with some background. It is accurate to say that the replication machinery moves relative to the DNA template. But as with many things in this class, the concept of being relative to something else is very important. If I tell you that the DNA is moving relative to the replication machinery, that does not indicate if it is the DNA that's doing the moving or the replication machinery that's doing the moving. But the original statement is still accurate -- relative to the DNA, the machinery is moving. Or just as accurate is that relative to the machinery, the DNA is moving. They both say the same thing. And this is the essence between these two models. For years, it was assumed that the replication machinery was doing the moving, reading along a more-or-less stationary piece of DNA. But recent evidence suggests that it could be the two different sets of replication machinery tethered to each other, and the DNA is "fed" through them (one fork each). It is still not absolutely certain which of these models is correct, so both are typically presented, but the scientific community is leaning toward the model with the stationary polymerases and "moving" DNA.

In any case, since this is an intro course, and I know you'll be learning a lot more in MCB 250, it's acceptable for us to visualize it the way that I believe is the easiest to grasp. But regardless of which model helps you visualize the process, the molecules are all doing what we talked about in class.

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