

These notes represent a detailed interpretation of the professor's lecture. They are not a transcript of the lecture. TakeNote® is best used as a supplement to your own notes, not as a substitute.

Lecture Date: Tuesday, March 14, 2006.

Announcements:

- The exam is in class on Thursday. The professor is aiming for a mean of 70.
- Becker House Dinner is cancelled tonight.

I. Second prelim (slide 3)
   A. PCR, DNA microarrays, cDNA, RFLP
   B. Topology L =T+W, σ= L/L_o, Type 1 and type 2 topoisomerase—the name just tells the type of enzyme; there are many different type I enzymes.
   C. Chromatin structure
      1. Nucleosomes – negative supercoils; the units of chromatin
      2. Condensin – positive supercoils (with help of topoisomerases)
   D. Replication initiation and termination
      1. OriC, dna, dnaB, primase (the primers for lagging strand are the same primers at the origin)
   E. Replication elongation – Pol I and Pol III (compare and contrast)
      1. Leading and lagging strand synthesis.
      2. The replisome -0 a molecular machine (know the parts)
   F. DNA repair – mismatch repair, excisional repair, direct repair, recombinational repair, error prone repair.
   G. DNA recombination – Homologous recombination, site-specific recombination.

II. Nonhomologous recombination
   A. Recombination that allows the movement of transposable elements – "jumping genes." The recombination does not rely on sequence homology
      1. **Barbara McClintock**, 1902-1992, Nobel Prize 1983. She was Cornellian. She was never faculty; she worked on rearrangement of genes in maize. She came very close to hypothesizing the mechanism (slide 4).
      2. There are two types of transposition:
         a) **Direct transposition**
            (1) Enzymes encoded by the transposon cleave the transposon from the DNA strand. The 3'OH ends attack the target DNA. Gaps are filled by DNA polymerase and DNA ligase.
            (2) The **sequence has jumped** from one location to another.
         b) **Replicative transposition**
            (1) **The segment is duplicated, so there is no deletion in the original piece, but there is an addition in another piece of DNA**.
            (2) Staggered nicks are made and the 3'OHs attack the target DNA.