

GENOME553 Winter 2004

Paper for Tuesday 13 January 2004

Hereford, L. M. and Hartwell, L. H. 1974. Sequential gene function in the initiation of *Saccharomyces cerevisiae* DNA synthesis. *J. Mol. Biol.* **84**: 445-461.

Questions for Thought

As you read, think about the questions listed below. Try to derive an answer from the paper or by thinking logically about the process. We will discuss these questions in class.

At the beginning of class, turn in BRIEF answers (one or two sentences) to the questions **in bold**.

1) Summarize the state of knowledge at that time. What is the pathway they are studying? What are the possible choices a yeast cell might make at this stage of the cell cycle? What was the purpose of these experiments? What are the two general approaches that they take to achieve their purpose and how do they differ?

2) Table 1: **Explain the logic of the reciprocal shift experiments.** What are essential aspects of these experiments? What are “restrictive conditions”? What is meant by “terminal phenotype”?

3) Figure 1: Explain the result with *cdc4*. How do they know how long to leave the cells at 36°C? What are they assaying? What if their only assay was cell division? What if the blocks to cell cycle advancement are slowly imposed?

Note: we will focus on Figure 1. Figures 2 and 3 give similar results.

4) Table 2: **Explain the logic of the double mutant studies.** What is an essential aspect of the mutant phenotypes for this experiment to work? What if they don’t have null alleles?

5) Table 3: Summarize their results. How do they put *cdc4* before *cdc7*? What evidence corroborates their inferred gene order?

6) Summarize the logic of these methods and indicate the restrictions or caveats to each approach.