**Data Analysis Problem**

by Marianna Pap and József Szeberényi

to accompany

*The Cell: A Molecular Approach,* Eighth Edition

Geoffrey M. Cooper

**10.1 Protein Synthesis in Poliovirus-Infected Cells**

This Data Analysis Problem is also found on page 349 of the textbook.

**Source:** Gradi, A., Y. V. Svitkin, H. Imataka, N. Sonenberg. 1998. Proteolysis of human eukaryotic translation initiation factor eIF4GII, but not eIF4GI, coincides with the shutoff of host protein synthesis after poliovirus infection. *Proc. Natl. Acad. Sci. USA* 95: 11089–11094.

**Level of difficulty:** Medium

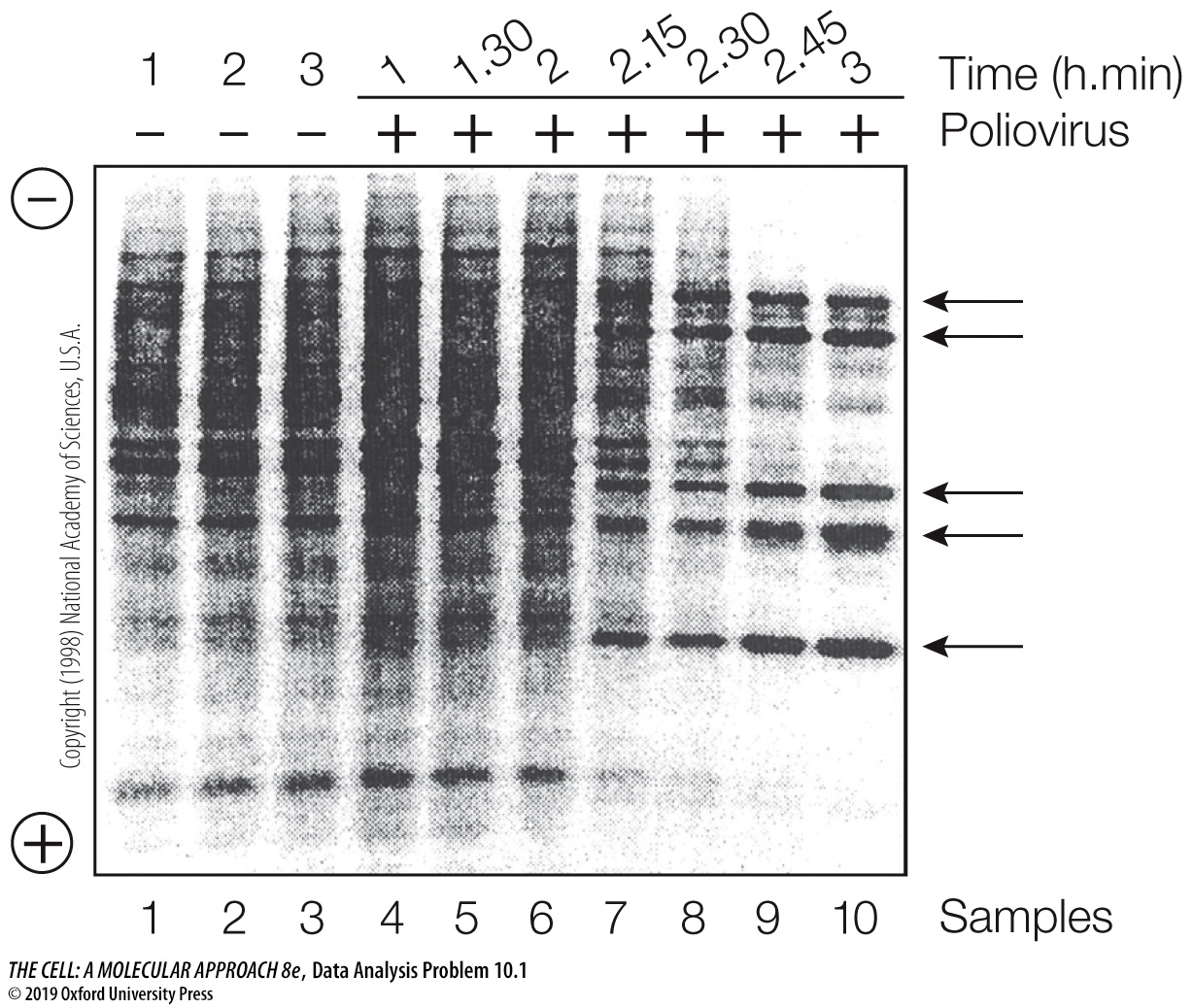
**Corresponding chapter(s) in the textbook:** Chapter 10

**Review the following terms before working on the problem:** HeLa cells, poliovirus, mock infection, [35S]methionine labeling, cytoplasmic protein extracts, SDS polyacrylamide gel electrophoresis (SDS-PAGE), autoradiography

**Experiment**

HeLa human tumor cell cultures were mock-infected (samples 1–3) or infected with poliovirus for the time periods indicated in the figure (samples 4–10). The cells were labeled with [35S]methionine for 30 minutes at the end of the incubation periods, and equal amounts of cytoplasmic protein extracts were separated by SDS-polyacrylamide gel electrophoresis. The gel was dried, and autoradiography was performed. (The charges of electrodes during electrophoresis are indicated by  and .)

**Figure**



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**Questions**

1. What was the purpose of [35S]methionine labeling?

2. Explain the band patterns made by the mock-infected samples (samples 1–3)?

3. What was the initial effect of poliovirus infection on [35S]methionine incorporation (compare samples 1 and 4)?

4. What are the bands indicated by the arrows on the right side of the autoradiograph?

5. What is the effect of longer poliovirus exposure on [35S]methionine incorporation (compare samples 3 and 10)?

6. What conclusions can be drawn from the results of this experiment?