**Data Analysis Problem**

by Marianna Pap and József Szeberényi

to accompany

*The Cell: A Molecular Approach,* Eighth Edition

Geoffrey M. Cooper

**3.2 Analysis of a DNase Regulating Protein**

This Data Analysis Problem is also found on page 110 of the textbook.

**Source:** Lesca, P., C. Paoletti. 1969. A protein inhibitor of acid deoxyribonucleases. *Proc. Natl. Acad. Sci. USA* 64: 913–919.

**Level of difficulty:** Low

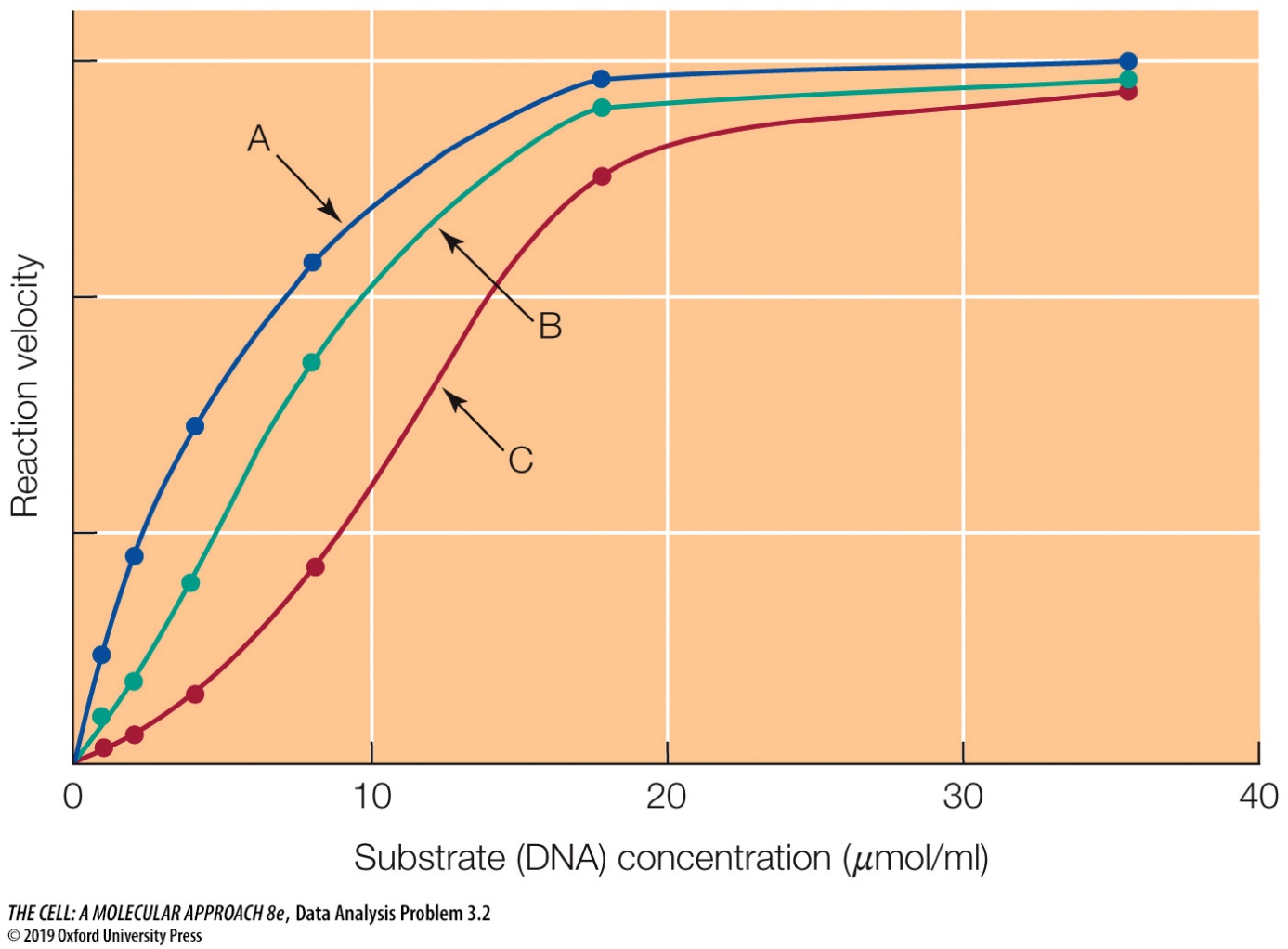
**Corresponding chapter(s) in the textbook:** Chapter 3

**Review the following terms before working on the problem:** nucleases, acid hydrolases, radioactive labeling, filter precipitation assay, mononucleotides, oligonucleotides

**Experiment**

A regulatory protein (designated protein X) isolated from mouse liver was tested in this experiment. Protein X specifically affects acid DNase isolated from a variety of tissues. *In vitro* reaction mixtures were set up containing purified DNase, different concentrations of radioactively labeled DNA substrate, and different concentrations of protein X: (A) No protein X, (B) low concentration of protein X, or (C) high concentration of protein X. At the end of incubation, reaction velocities were determined by measuring the release of low-molecular-weight products (mono- and oligonucleotides). The graph shows the effect of substrate concentration and protein X on DNase activity.

**Figure**



**Questions**

1. What must be done experimentally to assay DNase activity?

2. How does protein X affect DNase?

3. What is the relationship between the concentration of protein X and that of the substrate of the reaction?