**Data Analysis Problem**

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to accompany

*The Cell: A Molecular Approach,* Eighth Edition

Geoffrey M. Cooper

**12.2 The Release of Histamine from Mast Cells**

This Data Analysis Problem is also found on page 423 of the textbook.

**Source:** Röhlich, P., P. Anderson, B. Uvnäs. 1971. Electron microscope observations on compound 48/80-induced degranulation in rat mast cells. *J. Cell Biol.* 51: 465–483.

**Level of difficulty:** Low

**Corresponding chapter(s) in the textbook:** Chapter 12

**Review the following terms before dealing with the figure:** histamine, secretion, formaldehyde fixation, electron microscopy, heavy metal staining

**Experiment**

Mast cells synthesize and store histamine in the form of membrane-bound granules. Upon stimulation of these cells, histamine is released and triggers allergic reactions in the tissues.

The figure shows the result of an experiment in which the mechanism of histamine release was studied. A suspension of mast cells was treated with a drug that induces histamine release. After 10 seconds, the cells were quickly fixed in a cold formaldehyde solution and processed for electron microscopic analysis. Sections were stained with uranyl acetate and lead citrate (scale bar, 1 m).

**Figure**



**Questions**

1. What are the organelles/structures labeled with capital letters?

2. What phenomenon is indicated by the arrows pointing at organelle E?

3. What is the process by which histamine is released?