

CELL-MATRIX MECHANICS

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Homework #3

**Effects of mechanical forces on cells in culture.**

A bioengineer has been investigating the effects of mechanical strain on cells grown on a flexible polymeric membrane *in vitro*. The apparatus stretches the polymeric membrane, to which the cells are attached. The bioengineer has run a series of experiments in which she has changed the maximum strain in the flexible membrane in the center of the circular culture dish. After 2 hours, the bioengineer recovered all of the medium in the culture dish and measured the amount of a particular protein synthesized by the cells, which is reflective of the cell response. She plotted the graph in Fig. 1. You are to assist the bioengineer in interpreting her results.

- a. If the experiment was performed using the apparatus shown in Fig. 2a, which transduction mechanisms might explain the direct effects of mechanical strain on the cells in the regions (1) between points A and B, (2) between B and C, and (3) between C and D?
  
- b. If the experiment was performed using the apparatus shown in Fig. 2b, would your interpretation of the data change? If so, why and how?

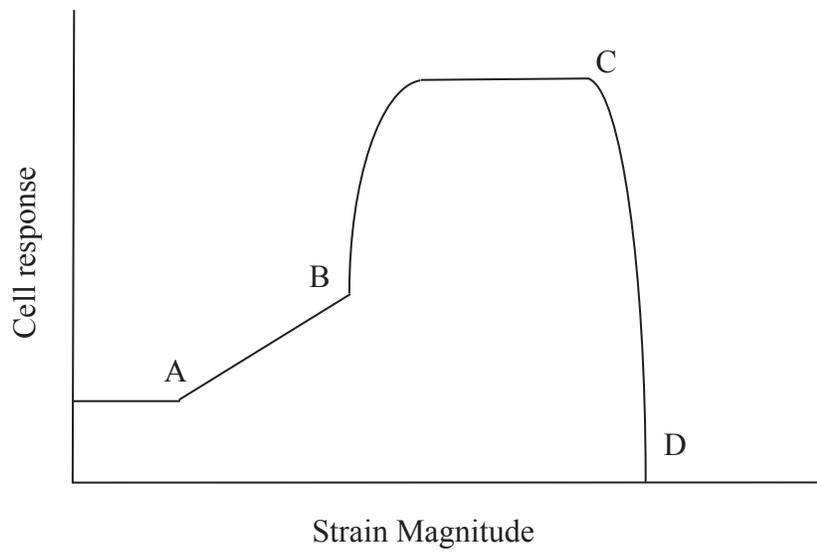


Fig. 1

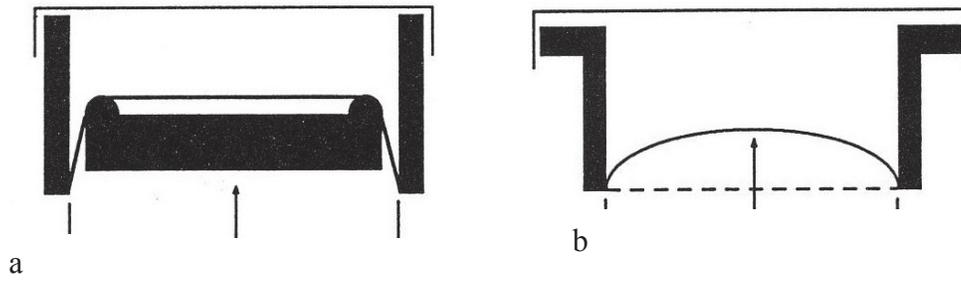


Fig. 2

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