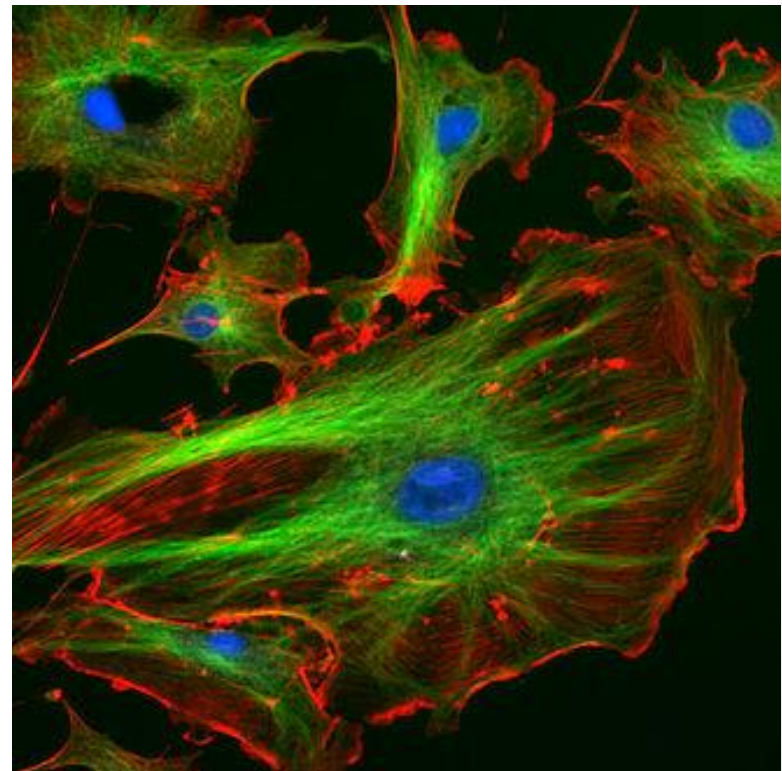


X-Events in Non-Social Systems

The Search for Fundamental Principles of Sudden Extreme Events

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X-Events in Social Systems

- Housing bubble
- Great Recession of 2008
- Restructuring of the Taxi Industry
- Platform economy



Potential Social X-Events

- Healthcare in U.S.
- Income Inequality
- Restructuring or destruction of the Republican Party
- Climate change
- War in the Middle East



X-Events in Social Animals

- Insect swarms
- Lemming migration



X-Events in Organisms

- Venus Fly Trap
- Bird Flight



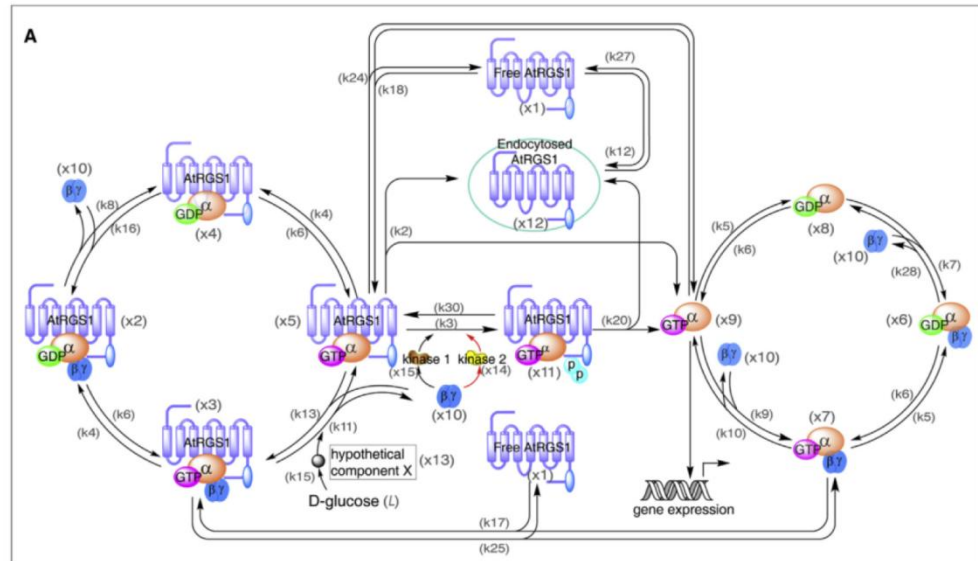
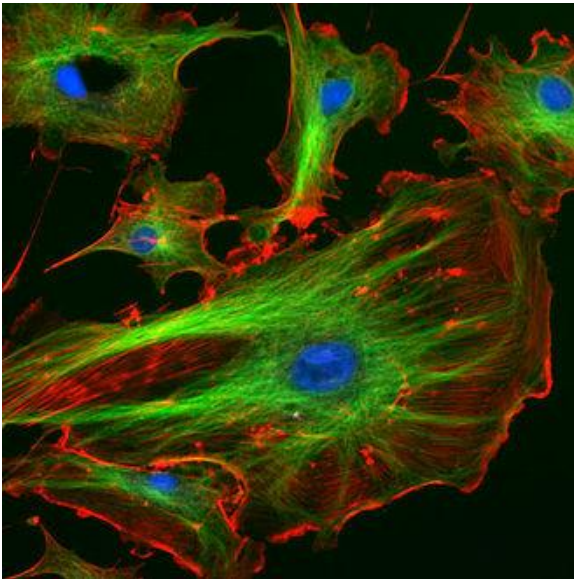
X-Events in Physics

- Explosions
- Phase transitions
- Hurricanes, tornadoes



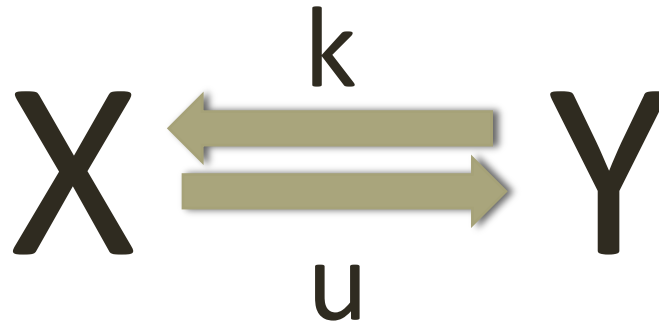
X-Events in Molecular Biology

- Dynamic catastrophe of microtubules
- Sensing and signaling circuits



This regime is particularly amenable to a general study of X-Events because the systems have evolved into little heterogeneous societies or factories with specific functions. This regime most closely resembles social systems.

X-Event in a Single Molecule



$$C = x + y$$

X is the concentration of a molecule in one state. Y is the concentration of the same molecule in another state. C is the total concentration of the molecule in both states.

k is a reaction rate. u is an input.

If k is very small and u is zero, then all the molecules are in X. If u is slightly different from zero, then all the molecules suddenly move to y.

Common Elements

- Stress in the form of complexity mismatch
- Flow of complexity
- “Cocked” null or trending state
- Sudden destruction of simple flows and states
- Sudden creation of a new flows and states

