Role of integrin adhesions in cellular mechanotransduction

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Propositions

accompanying the thesis

Role of Integrin Adhesions in Cellular Mechanotransduction

1. Blocking the physical tumor-extracellular matrix interaction can interfere with multiple aspects of cancer progression including growth, invasion, and tumor-angiogenesis.

   Chapter 2 of this thesis

2. Altering integrin expression profiles during active processes, e.g. tissue remodeling, angiogenesis, wound closure and cancer progression, allow cells to change their mechanoresponses thereby affecting morphological plasticity.

   Chapter 3 of this thesis

3. Exploration of the spatial information in super resolution imaging permits to extract the number of molecules in a macromolecular complex without knowledge of the labeling stoichiometry.

   Chapter 4 of this thesis

4. The relation between the force supported by an adhesion and the abundance of proteins in the adhesion differs for each adhesion protein and depends on the substrate stiffness.

   Chapter 4 of this thesis

5. Cellular forces are necessary for cell migration.

   Newton's law of motion

6. Techniques that uncouple different physical properties of the environment are useful to isolate the principal physical stimuli inducing a given phenotype.

   This thesis, Trappmann, B. et al., Nat Mater (2012), *Sapudom, J. et al.,* Biomaterials (2015)

7. When addressing a biological question with microscopy, it is sensible to start with less invasive lower-resolution methods and move progressively, only as needed, to more invasive higher-resolution methods.

Li, D. et al., Science (2015)

8. The fact that fibrous environments enable long-range force propagation should be considered in biomaterial design.

Chapter 2 of this thesis,
Ma, X. et al., Biophysical Journal (2013)

9. Identifying and implementing the chemical and physical condition that would make the cancer phenotype disadvantageous; would not only stop cancer progression, but also would reverse the process of carcinogenesis.

10. The first and most important step of image analysis is to have a good image.

This thesis

11. The strong competition in academics for grants and positions has led to the notion that high impact-factor publications are the goal of science.

12. Mutations happen randomly and give unprecedented advantage to some cells that may result in tumors to cause harm to the host system; inheritance of wealth, intelligence and nationality has the same effect worldwide.

13. Richness that is not based on research and development is only the result of higher inequality.

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