GPCR and G protein mobility in D. discoideum : a single molecule study

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Propositions

accompanying the PhD thesis:
GPCR and G protein mobility in D. discoideum
a single molecule study

1. Compartmentalization of highly mobile signaling molecules is a way for *D. discoideum* cells to prevent signal delocalization at the leading edge while preserving high reaction speeds (chapter 2 of this thesis).

2. The movement of membrane proteins is a direct reflection of the underlying structure of the cell membrane making single molecule microscopy very well suited for the study of biological membranes and their interaction with the cytoskeleton (chapter 1 of this thesis).

3. Although both the GPCR cAR1 and its associated G protein are homogeneously distributed over the cell membrane of a chemotaxing *D. discoideum* cell, their behavior is highly polarized suggesting feedback loops acting directly on the first steps of signaling (chapter 2 and 3 of this thesis).

4. Ras/PI3K/F-actin signaling functions autonomously to constantly create pseudopods resulting in movement even in the absence of stimulus and as such can be considered the motor of chemotaxis. In this analogy the cAR1 G protein system is the steering wheel providing a directional bias to the cell (Sasaki et al., 2007).

5. Because of low copy numbers of participants, deterministic models are inadequate to describe most biological systems (Choi et al., 2008).

6. The placement of *D. discoideum* pseudopods is probabilistic in nature and governed by gradient parameters as well as the signaling state of the cell (Bosgraaf et al., 2009).

7. The fact that *rasC*$^{-}$*/rasG*$^{-}$ *D. discoideum* cells do not show chemotaxis is due to the fact that they don't express cAR1 properly (chapter 4 of this thesis, Bolourani et al., 2006).

8. The creation and maintenance of a complex spatial organisation puts restrictions on the properties of signaling molecules (Postma and van Haastert, 2001).