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Polarization and molecular information transmission in the cell ADRIANO VALDEZ-GOMEZ, GUILLERMO RAMIREZ-SANTIAGO, Instituto de Fisica, Universidad Nacional Autonoma de Mexico — During chemotaxis, pseudopodia are extended at the leading edge and retracted at the back of the cell. Efficient chemotaxis is the result of a refined interplay between signaling modules to transmit and integrate spatial information such as PtdIns(3,4,5)P3. The localization of PtdIns(3,4,5)P3 is expected to depend on the distributions or activities of PI3Ks, PTEN, and 5-phosphatases. The spatial signals spread relatively slowly so that high local concentrations of PIP3 in the plasma membrane appear in patches. These gradients induce localization of PIP3 and PTEN to the front and back of the cell, respectively. To simulate this polarization process that involves the action of seven reaction-channels inside the cell we carried out extensive stochastic simulations using Gilliespie algorithm. The simulations were done on a square cell with ten thousand sites (100×100) emulating a square cell with side $10\,\mu m$ long. We found that there are localized patches of PIP3 at the active receptors and segregation of PTEN on the opposite side of the cell. When we block the reaction-channel, $PTEN + PIP3 \rightarrow PIP2$ that involves the production of PIP2 we obtained a five-fold increase in the concentration of PIP3. This finding appears to be consistent with the o

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