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Netlogo project: epitheliomhe implementation

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# Epitheliome: the model

The present report introduces a NetLogo implementation of the Epitheliome, an agent-based model which mimics a single-layer epithelial tissue, based on the rules and simulations carried out by Walker et al. (2004, 2004). In their study, they defined simple growth, migration, and bonding rules in order to analyse the social behaviour of cells at the population level, and how this behaviour varies according to parameters such as cellular type, extracellular calcium, and tissue wounding.

## The extracellular medium and external parameters

The extracellular medium of this model consists of a bidimensional *world* with dimensions of 60 x 60 patches. In order to simulate several world sizes without modifying the world size directly, the parameter *scale* was introduced; this variable scales the cells dimensions such that, if its value is set to 20, each unit observed in the world corresponds to 20 µm.

In the present model, patches are only handled to visualise, with a colour code, the two calcium concentrations that were taking into account in the study: low (0.09 mM) and physiological (2.0 mM). It is possible, as well, to simulate cell cultures of both keranocytes and urothelial cells, which have cell cycle length differences.

Finally, it is also possible to vary the initial seeded cell number from 10 to 100.

## Cells are modelled as turtles

Epithelial cells are implemented as NetLogo turtles, due to their capability of migration. Thus, each cell is modelled as a circular shaped turtle, whose size depends on two variables: the *true* radius, and the *apparent* or *spread* radius (*s-radius*), which corresponds to the radius that is observed from above when a cell spreads on the substrate.

## Cell cycle dynamics

## Cell bonding

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## Cell migration

## Cellular types

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# Model simulations

## Cell growth dynamics

## Wound healing

# References

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