

A Reaction-Diffusion System coupled to active motion in a cell

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Mitochondria are the cells' power plants. They produce ATP from an energy substrate. Energy production leads to aging and consequently to a reduced production rate. Mitochondria by themselves are produced in the cell body and in the case of neurons have to travel relatively long distances (up to the order of *mm*) to reach the location of highest need (the synapse). It is known that some Parkinsons Disease mutations lead to garbage agglomeration around the cytoskeleton – the highway for mitochondria transport, thus affecting the transport properties.

The substrate for energy production in the case of neurons is introduced into the axon via specific transporters whose functioning is essential for axon integrity.

We present a work on a reaction diffusion system spatially linking the mitochondrial motion and location to the production and consumption of diffusing species ATP and lactate.
