

THE EXTRACELLULAR MATRIX AS THE INTERNAL COGNITIVE ORGAN OF THE MULTICELLULAR ORGANISM

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The animal autopoiesis for a standard viability tube of its species is characterised by

- A growing and then homeostatic cell renewal of almost all its tissues, with a speed varying from some days for the stomach cells to some months for the bones and even many years for the neurons and glial cells, that constitute the ‘external sensorimotor recurrent network’ of the whole organism;
- A permanent circular homeostatic renewal through the blood capillaries of the extracellular matrix:
 - The nano-inputs and nano-outputs of the extracellular matrix and its homeostatic fractone storage of all proteoglycans (for the homeostatic renewal of a little number of cells);
 - The lymphocytes for the immunity against living nano-organisms;
 - The neutrophils for repairing some internal or external injury of tissues.

All these homeostatic dynamics of the extracellular matrix are nothing else than the result of ‘internal sensorimotor recurrent networks’. It is proved for a recurrent network that 1) its internal state plays the role of the hidden state in a hidden Markov chain and 2) each hidden state represents a set of equiprobable futures (as ‘learned’ from the whole past!), i.e. a deep cognitive coordination property. And each fractone with its homeostatic role for delivering their proteoglycans to a little number of cells plays a crucial role in the whole animal autopoiesis.

Such characteristic property of internal and external homeostatic sensorimotor recurrent networks is also present in plants, in eukaryotes, prokaryotes as well as in cyanobacterias. That involves the following thesis characterising

the living organisms with its internal and external sensorimotor recurrent network: a living organism is both autopoietic and cognitive at all its organisational levels.