Fractones are associated with a fibroblast/macrophage network through the meninges/choroid plexus to drive adult neurogenesis

Fréderic Mercier
Deep Matrix Microsystems, Kerlouan, France;
Society for Fractones, Kerlouan, France
frederic.mercier@fractones.org

September 17, 2023

The current view is that our genes are the principal means by which our body constructs during development and rules our functions and disfunctions throughout life. However, more and more data point out that that the extracellular matrix (ECM), ECM-borne glycoproteins that locally change their motives according to the local extracellular environment, and fibroblasts and macrophages, intervene in morphogenesis, new cell generation throughout life, response to injury and disease.

Therefore, the question arises as to whether a physiological system, based on ECM and connective tissue performs physiological functions, but also intervene in pathological conditions. Here, I will introduce the fibroblast/macrophage (FM) network and its association with the ECM network of fractones for transducing information and communication throughout the brain, with a focus on the generation of new neurons in adulthood.

While fractone-borne glycoproteins bind and activate growth factors to locally regulate proliferation/differentiation of adjacent neural stem cells and the generation of new neurons, the question arises as how multiple fractones work together to regulate the entire brain neurogenic zone.

We characterized macrophages, perivascular fibroblasts and choroid plexus-originating Kolmer cells next to fractones. Using transgenic green-fluorescent mice as a source for choroid plexus cells to xenograft through the brain of host regular mice, we show that fluorescent grafted choroid plexus cells behave as neural stem cells after they traverse the brain ventricle walls and dock to fractones.

The fluorescent chroroid plexus cells, originally unable to behave as neural stem cells, are now able to produce neurospheres in culture. This strongly suggests that fractones turn choroid plexus cells into neural stem cells. More-

over, we have evidence that a network of choroid plexus fibroblasts, connected through gap junctions, prolongates in the superficial meninges. Killing the fibroblasts in the superficial meninges with 6-hydroxydopamine resulted in raising neurogenesis.

Taken together, these results indicate that the meninges/choroid plexus regulate new neuron production in the adult brain via fractones. We anticipate that meninges orchestrate growth factors/cytokines and guides cell proliferation/differentiation via fractones through the ventricle walls. Further understanding of this system will provide insights into innovative therapies for neurodegenerative disorders such as Alzheimer, Parkinson and Lateral Sclerosis.