Aging of the extracellular matrix structure fractone in the mouse subventricular zone.

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In adulthood, the subventricular zone (SVZ) of the lateral ventricles is one of the restricted places where neurogenesis persists. In this neurogenic niche, extracellular matrix (ECM) structures termed fractones are in contact neural stem cells and their immediate progeny. Fractones are composed of ubiquitous ECM components including heparan sulfate proteoglycans such as perlecan and agrin. We previously showed that fractones are able to capture and promote the activity of growth factors through heparin binding mechanism in order to regulate neurogenesis. With aging, neurogenesis is known to decrease. However, the effect of aging on fractones structure and composition remains unknown.

In this study, we investigated fractones structure and composition in 10 weeks old and 2 years old animal. We report that, while fractone number decreased, fractone size dramatically increased with aging. The morphology of niche cells was changed but they kept direct contact with fractones. Despite the change in size fractones, major ECM constituent were still present in the aged subventricular zone. However, the fine structure of sulfated glycosaminoglycan chains contained in fractones was modified with aging. Together, our results suggest that the changes observed in fractones structure and specific composition, are critically related to aging of the SVZ neurogenic niche.

Key words: fractone, SVZ, heparan sulfate.