Development of ECM mimetics for 3D bioprinted GBM models

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Abstract*:* Glioblastoma Multiforme (GBM) is one of the most widespread malignant brain tumor, still representing an important cause of mortality in Europe with a median survival of around 1 year from diagnosis. One of the major actors involved in GBM progression and invasiveness is the differential gradient of hyaluronic acid in the brain microenvironment at extracellular level. Given the key role of HA in cell mediated ECM remodeling, biomaterials-based 3D cell model able to resemble the biochemical and structural properties of GBM are highly desirable to characterize tumor pathogenesis and combined therapeutic strategies. Here, we report the development of a library based crosslinked hyaluronic acid and collagen or gelatin hybrid hydrogels, employable in the development of GBM 3D tissue cultures obtained by 3D bioprinting. Tunable 3D GBM models with different HA gradient and crosslinking degree have been developed and tested for their biocompatibility with human-glioma U87 and neural stem cells derived from human glioblastoma multiforme (G166). After this step, G166 are then encapsulated in order to obtain an in vitro bioprinted model suitable for high performance predictive screening and studying tumor microenvironment.