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Short Communication

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The genomic profile of human malignant glioma is altered early in primary cell culture and preserved in spheroids

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Abstract

Screening of therapeutics relies on representative cancer models. The representation of human glioblastoma by *in vitro* cell culture models is questionable. We obtained genomic profiles by array comparative genomic hybridization of both short- and long-term primary cell and spheroid cultures, derived from seven glioblastomas and one anaplastic oligodendroglioma. Chromosomal copy numbers were compared between cell cultures and spheroids and related to the parental gliomas using unsupervised hierarchical clustering and correlation coefficient. In seven out of eight short-term cell cultures, the genomic profiles clustered further apart from their parental tumors than spheroid cultures. In four out of eight samples, the genetic changes in cell culture were substantial. The average correlation coefficient between parental tumors and spheroid profiles was 0.89 (range: 0.79–0.97), whereas that between parental tumors and cell cultures was 0.62 (range: 0.10–0.96). In two out of three long-term cell cultures progressive genetic changes had developed, whereas the spheroid cultures were genetically stable. It is concluded that genomic profiles of primary cell cultures from glioblastoma are frequently deviant from parental tumor profiles, whereas spheroids are genetically more representative of the glioblastoma. This implies that glioma cell culture data have to be handled with the highest caution.

Keywords: glioma, primary cell culture, spheroid, comparative genomic hybridization, microarray