

Infrared spectra of human glial cells could be related to prognostic features

*Gaigneaux A., #Decaestecker C., #Camby I., #Kiss R., *Ruysschaert J.M.,
*Goormaghtigh E.

*Laboratoire de Structure et Fonction des Membranes Biologiques,
Université Libre de Bruxelles, Bld du Triomphe, B-1050 Bruxelles.

Laboratoire d'Histopathologie, Université Libre de Bruxelles,
808 route de Lennik, B-1070 Bruxelles.

Introduction.

Gliomas represent 40% of primary malignant brain tumors and include astrocytic tumors which represent about 60-70% of the group. In these tumors, dismal prognoses are directly associated with their marked ability to diffusely invade the brain parenchyma.

In this study we investigate whether infrared spectrum of human glioma cells could be related to biological characteristics of human glial tumors. For this purpose, we measured characteristic infrared spectra of 9 human glioma cell lines. The levels of migration and invasion of these 9 cell lines were measured *in vitro* and *in vivo*. In a first step we tried to establish a relationship between glioma cell aggressiveness and biochemical markers through their infrared characteristics. In a second step, we showed that infrared spectra contain sufficient information to allow the building a prognosis tool using multiple regression.

Results.

The motility levels of the cells were measured *in vitro* by means of a computer-assisted phase-contrast videomicroscopy. Cells moving faster seem to have a lower CH₂ content (relative to their protein content) than cells with high motility. Actually, these cells have less intensity at 2852 cm⁻¹. It seems not associated with a protein content modification as the CH₃ content is not changed.

The *in vivo* aggressiveness of the cell lines was determined by grafting them into the brain of nude mice and monitoring the survival period. A relation between the Median Survival Time of nude mice and the infrared spectra of cells allowed us to build a prognostic tool of biological aggressiveness. This relation is based on CH₂, CH₃, and protein spectral features.

Gliomas of astroglial or oligodendroglial origin differ significantly in their susceptibility for anaplastic progression and aggressive growth. We show here that cells from oligodendroglial or astrocytic origin can be distinguished by their infrared spectra in the lipids acyl chain region.

Conclusion.

Our result show that the relation between infrared spectra and biological aggressiveness of human glioma cell lines, if clinically confirmed, could contribute additional prognostic information to that brought by conventional histopathology grading.