

Soutenance de Thèse – SOLEIL

Spécialité : Biophysique Moléculaire et Cellulaire

Synchrotron Based Fourier Transform Infrared Microspectroscopy and Fluorescence Microscopy : Application on Photodynamic Treated Cancer Cells

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Petit Amphi – Bât. Accueil SOLEIL

In this thesis, we studied the photodynamic effects of Hypocrellin A on four cancer cell lines using fluorescence microscopy, cytotoxicity tests and FT-IR microspectroscopy.

As HA is a natural fluorescent substance, we used this intrinsic property to observe its localization in HeLa cells by fluorescence microscopy. The fluorescence images revealed that HA did not penetrate into the nucleus but localized in the cytoplasm and aggregated perinuclearly after 24 hours of incubation.

MTT viability assay was performed to evaluate the optimum PDT conditions (HA and light dose) which induced cell death in the four cell lines HeLa, Calu-1, K562, K562 RSTI571. The dark toxicity of HA on all cell lines is low, but is increasing dose-dependently. The phototoxicity of HA on all cell lines was increasing in both HA dose and light dose dependent manner. The light irradiation alone affected only negligibly the cell survival. HeLa cells are sensitive to HA PDT than Calu-1 cells. We found also that K562 and K562 RSTI are sensitive to HA. Moreover the synergetic effect of HA and Glivec® on K562 RSTI was observed.

FT-IR microspectroscopy detected the changes in the secondary structure of proteins exhibiting an increase of beta sheets characteristics frequency affected by ROS generated from PDT, with a predominant shoulder at around 1630 cm^{-1} (for the Amide I band) and 1530 cm^{-1} (for the Amide II band). Moreover, a slight decrease of the lipid intensity was noticed.

Coupling fluorescence microscopy and FT-IR microscopy was carried out on the same instrument. Fluorescence microscopy could reveal the modes of cell death while FT-IR microspectroscopy showed effect of HA PDT on the secondary structure of proteins.

All approaches carried out in this thesis revealed that even HA did not penetrate in the nucleus but there are changes in secondary structure of proteins in nucleus which can be observed by FT-IR spectromicroscopy.

JURY

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Vous êtes cordialement invités au pot qui suivra



Formalités d'entrée : accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi Soleil du Bâtiment Central, merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).

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