The investigation of Glycan Alteration of UVA-exposed Skin Cells using Wax Physisorption Kinetics

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Abstract

Infrared wax physisorption kinetics (iR-WPK) imaging is employed for investigating the level of glycosylation alteration of skin cells after UVA treatment by using paraffin wax (Paraplast®, n-$C_nH_{2n+2,}$ n=24~26) and beeswax ($C_{46}H_{92}O_2$) as glycan adsorbents for binding regular and elongated oligosaccharides residue (glycans) covalently attached to a protein or lipid anchored in the cell membrane, respectively. The level of glycosylation alteration of skin cells was strongly suggested correlating with the ratio of beeswax to paraffin wax remnant adhering onto skin cell samples, fibroblast (FB), HSC-1, and HaCaT after a series of exposure doses of UVA irradiation, respectively. The IR absorption ratio of Beeswax/ paraffin remain in the spectral range of 3000-2800 cm^{-1} of skin cancer cells was decreased after low-dose UVA exposure, and increases after high-dose. Altered glycan population displaying the higher ratio of FB, HSC-1 and HaCaT on 5.62±1.27 (2 min, 1.2 J/cm^2), 1.94±0.68 (10 min, 6.0 J/cm^2) and 2.66 ± 0.72 (3 min, 1.8 J/cm^2). Therefore, we demonstrated that glycans of glycoconjugates anchored on the cell membrane be altered after irradiating UVA radiation, triggering the inflammatory process according to the changed distribution of regular and elongated glycans of skin cell surface. The method of iR-WPK imaging could be a platform for assessing the UVA-modulated cellular glycosylation alteration of skin cells.

Keywords – Infrared *Wax Physisorption Kinetics, UVA,* Glycosylation, *Glycans*

References

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