

FABRICATION AND CHARACTERISATION OF ORGANIC THIN FILMS FOR APPLICATIONS IN TISSUE ENGINEERING*

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In several recent communications from these laboratories, we have described observations that thin organic layers which are rich in primary amine (C-NH₂) groups are very efficient surfaces for the adhesion of mammalian cells, even for controlling the differentiation of stem cells. We prepare such deposits by plasma polymerisation at low pressure (thin films designated “L-PPE:N”, for “Low-pressure Plasma Polymerised Ethylene containing Nitrogen”), at atmospheric (“High”) pressure (“H-PPE:N”), or by vacuum-ultraviolet photo-polymerisation (“UV-PE:N”) ¹.

In the present communication we shall, first, briefly describe those fabrication techniques; next, and more important, we discuss the comparative results of physico-chemical characterisations of those various organic deposits, which deliberately contain varying concentrations of N, [N], and amine groups, [NH₂]. These investigations include solubility measurements in aqueous cell-culture media, and studies of structural properties by XPS (with and without chemical derivatisation with TFBA), FTIR, SEM, among others.

Finally, we present certain selected cell-biological results that pertain primarily to applications in vascular medicine, and we discuss the influence of surface properties on the observed behaviours of various vascular cell lines ².

1. F. Truica-Marasescu, P.-L. Girard-Lauriault, A. Lippitz, W.E.S. Unger, and M.R. Wertheimer, “Nitrogen-rich Plasma Polymers: Comparison of Films Deposited in Atmospheric- and Low-Pressure Plasmas”, *Thin Solid Films* 516, pp 7406-7417(2008)

2. S. Lerouge, A. Major, P.-L. Girard-Lauriault, M.-A. Raymond, P. Laplante, G. Soulez, F. Mwale, M.R. Wertheimer, and M.-J. Hébert, “Nitrogen-Rich Coatings for Promoting Healing Around Stent-Grafts for Endovascular Aneurysm Repair”, *Biomaterials* 28, pp 1209-1217 (2007)

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