ROYAL MICROSCOPICAL SOCIETY
Institute of Materials

MICROSCOPY OF BIOMATERIALS MEETING II

University of Bath

Wednesday 16 April 1997

PROVISIONAL PROGRAMME

1000-1020	Registration and Coffee	
1020-1030	Welcome and Introduction	
1030-1115	**S. Mann**	TITLE TO BE SUPPLIED
1115-1130	**T. Nicholson**	Durable bioceramics: the teeth of the Australian parrotfish
1130-1145	**F. Vollrath**	Structural hierarchy of spider silk
1145-1230	**L. Hench**	Microscopy of bioactive glasses: a review
1230-1245	Discussion	
1245-1400	Lunch / POSTERS / Exhibition	
1400-1445	**M. Freeman**	TITLE TO BE SUPPLIED
1445-1500	**P. de Aza**	Electron microscopy study of a wollastonite-tricalcium phosphate Bioeutectic® material
1500-1515	**J. Huang**	Evaluation of *in vitro* performance of Bioglass®/polyethylene composite by microscopy
1515-1530	**C. Scotchford**	Application of confocal microscopy to the study of bone cell responses to biomaterial surfaces
1530-1545	**H. Gledhill**	*In vitro* fatigue testing of vacuum plasma sprayed hydroxyapatite coated implants aged in Ringer's solution
1545-1600	**D. Gordon**	Evaluation of scanning electron microscopy for use in the study of the bone-biomaterial interface
1600-1615	~~**A. Minnocci**~~ G. Soldani	Permeability versus porosity in microporous small-diameter vascular grafts made by a "spraying, phase inversion technology"
1615-1630	**I. Schmitz**	Ultrastructural investigation of vascular grafts
1630-1645	Discussion	
1645-1700	Tea and POSTER PRIZE	
1700	CLOSE OF MEETING	

POSTER PRESENTATIONS

P1	**D. Corrand**	The effect of some C_3-saturated organic molecules on the *in vitro* precipitation of hydroxyapatite
P2	**H. Gledhill**	Morphological comparison of hydroxyapatite coatings produced by two different thermal spray techniques
P3	**P. Hatton**	Ultrastructure of glass-ionomer (polyalkenoate) cements in the transmission electron microscope
P4	**C. Hodges**	Thermal microscopy of biofilms
P5	**A. Lawson**	Diffusion controlled precipitation of calcium phosphate on collagen
P6	~~**A. Minnocci**~~ G. Soldani	Microscopical evaluation of nerve guidance channel internal surface microgeometry and material biostability
P7	**J. Minns**	Microscopical investigation of metal-on-metal wear of removed polyethylene-on-metal total knee prostheses
P8	**P. Mummery**	Failure mechanisms in natural composites
P9	**B. Shahgaldi**	Tissue metallosis caused by corrosion of stainless steel fracture fixation devices
P10	**F. Vollrath**	Structural elements of spider silk investigated with transmission electron microscopy

Microscopical evaluation of nerve guidance channel (NGC) internal surface microgeometry and material biostability

G. Varelli, A. Minnocci, P. Dario and G. Soldani

The peripheral nervous system (PSN) has regenerative capability. So, after an injury, axons can repair the gap between the stumps if it is not too large. To avoid this problem surgeon use the technique of the suture under tension or nerve grafting supported by NGC. The influence of inner surface (IS) microgeometry of NGC on nerve regeneration has already been reported in literature. NGCs featuring a smooth IS allow a better regeneration of the nerve cable. We manufactured polyurethane (PU) NGCs with a highly smooth IS and evaluated them by AFM and SEM. AFM of PU-NGCs show roughness less than 600 nm, whereas comparative silicone NGCs show roughness over 1400 nm. Implantation experiments of PU-NGCs show, after 6-8 week, a good channel biostability and excellent regeneration of the nerve cable. SEM of the PU-NGC show no evidence of microcracking in the external surface with inside a well regenerated nerve cable.

Permeability versus porosity in microporous small-diameter vascular graft made by a "spraying, phase-inversion technology"

A. Minnocci, G. Varelli, R. Bozzi and G. Soldani

Porosity is a key feature in synthetic small-diameter vascular grafts (SDVGs) design and development. To manufacture porous SDVGs we used a novel technology named spraying, phase-inversion (SPI) which introduce the question of how to evaluate the porosity of these grafts. Stiff grafts made of Dacron and PTFE were traditionally evaluated by water permeability (WP), however grafts made by SPI feature a filamentous sponge-like structure and, therefore, the relationship between WP and porosity is not know. To investigate this issue WP was evaluated measuring the volume of degassed water filtering in one minute trough the graft wall, at 120 mm Hg of pressure. SEM digitalized slow-scan image was used to estimate percentage of luminal and external surface open area. By an image analysis system a grey value threshold was applied to discriminate open from close area and to calculate their surface ratio. Preliminary data indicate a direct correlation between WP and percentage of open area.