

Two-Day Workshop: Nanomedicine: Principles, Technologies and Applications **Cranfield University, 23rd-24th Sep 2009** **Programme**

23rd Sep 2009

- 09.00 – 09.30 **Registration and Refreshments**
- 09.30 – 09.45 **Welcoming/Introduction**
- 09.45 – 10.45 **Introduction to Nanomedicine**
Dr Yi Ge, Cranfield University
- What & why is nanomedicine
 - Nanotechnology-an introduction to the concepts and techniques
 - Survey of advanced medical technologies
 - Introduction to the potentials, applications and challenges of nanomedicine
 - Overview of nanomedicine markets and business aspects
- 10.45 – 11.00 **Refreshments**
- 11.00 – 12.00 **Nanobiology in Medicine**
Dr Tracey Bailey, Cranfield University
- Cell structure and function overview
 - Human biology overview – physiology, interaction and coordination of body systems
 - Disease states and biomarkers
 - Cellular and molecular response to nanoparticles
 - Nanoparticles and human health
- 12.00 – 13.00 **Medical Nanomaterials**
Dr Mike Whitcombe, Cranfield University
- Concept of nanostructure and their size
 - Analytical methods and instrumentation used for nanostructure characterisation
 - Synthesis and functionalisation chemistry of organic based nanomaterials
 - Synthesis and functionalisation chemistry of inorganic based nanostructure
 - Synthesis and functionalisation chemistry of hybrid nanomaterials
 - Nanomaterials in medical applications
- 13.00 – 14.00 **Lunch**
- 14.00 – 15.00 **Nanostructure Design and Computational Modelling**
Dr Kal Karim, Cranfield University
- 15.00 – 15.15 **Refreshments**
- 15.15 – 16.15 **Demonstration and/or Practice**
Dr Elena Piletska, Cranfield University
- 16.15 – 16.30 **Summing up**
- 17.30 – 18.30 **Dinner**
- 18.30 – 20.00 **Plenary Lecture**
Prof David Cullen, Cranfield University

09.00 – 09.15

Introduction

09.15 – 10.15

Advanced Nanotechnology in Medicine I

Dr Giuseppe Battaglia, University of Sheffield

- Bio-nanomaterials
- Tissue Engineering at the nanoscale
- Biological barriers at the nanoscale
- Nanoparticles in therapeutics
- Nanoparticles in imaging

10.15 – 11.15

Advanced Nanotechnology in Medicine II

Dr Iva Chianella, Cranfield University

- Biosensor and nanobiosensor concepts
- Fundamental on transduction methods: electrochemical, acoustic, optical, calorimetric
- Nanobiosensors for medical diagnostic
- Fundamental on drug delivery and therapeutics
- Nano-devices for drug delivery
- Nano-devices for theranostics (simultaneous diagnosis and drug delivery)

11.15 – 11.30

Refreshments

11.30 – 12:30

Nanopharmaceuticals

Dr Yi Ge, Cranfield University

- Drug discovery, including combinatorial chemistry and synthesis on the molecular and macromolecular scale
- Advanced pharmaceutical science
- Pharmaceutical production and quality assurance
- A perspective of nanopharmaceuticals - from the bench to the surgical patient
- Design and use of nanopharmaceuticals
- Polymeric nanopharmaceuticals
- Regulation of nanopharmaceuticals and devices
- Clinical status and future opportunities

12.30 – 13.30

Lunch

13.30 – 14.30

Nanotoxicology

Dr Huijun Zhu, Cranfield University

- Acute and chronic toxicological end-points in mammals
- Target organ toxicology
- In silico, in vivo and in vitro models used in toxicological hazard and risk assessment
- Protocols and guidelines for experimental studies, and the implications of the requirement for quality assurance systems
- Developing strategies for testing chemicals for a range of regulatory purposes
- Implications of the Replacement, Refinement and Reduction of Animals in Research (3Rs) principle
- Mixtures chemistry
- Application of knowledge to the specific area of the toxicity of nanomaterials drawing on identified examples

14.30 – 15.30

Nanomedicine As a Business Venture

Prof. Tony Turner, Cranfield University

- Nanomedicine: science fiction to sound investigation?
- Trends in the nanomedicine market
- Identification of “appropriate” idea
- Developing a business case to generate income
- Nanomedicine and the law (including patent)
- Future outlook of business aspects in nanomedicine

15.30 – 15.45	Refreshments
15.45 – 16.00	Introduction to patents <i>Mewburn and Ellis</i>
16.00	Summing up and Closing Remarks