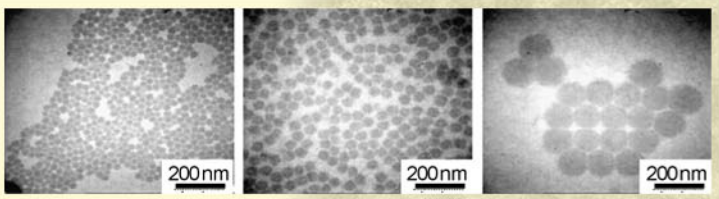
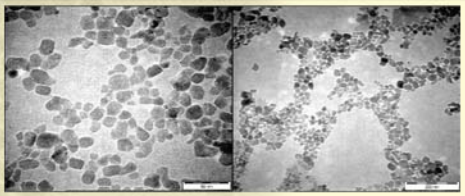
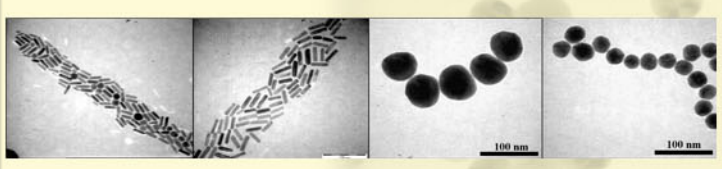


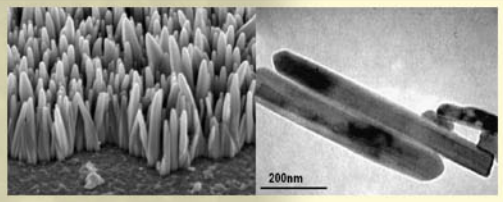
NanoSilica



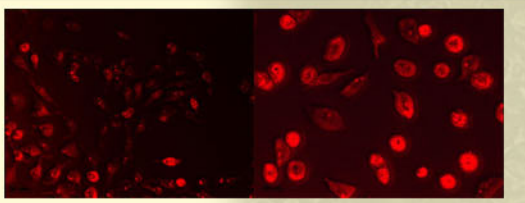
NanoMag



NanoGold



ZnO Nanorods



Cell uptakes of Nanosilica loaded DiI

Potential applications of specialized nanoparticles

Nanoparticles	Potential applications
NanoSilica	• Drug delivery system (DDS • Molecules carrier
NanoMag	• Therapy – DDS, hyperthermia, radiotheraphy combined with MRI etc. • Diagnosis-MRI, sensing, cell sorting, bioseparation, enzyme immobilization, immunoassays, transfection, purification
NanoGold	• Immunosensors, X-ray contrast agent, DNA-AuNPs assemblies and sensors, AuNP enhanced immunosensing, AuNP sugar sensors, AuNPs bioconjugates (peptides, lipids, enzymes, drugs and viruses), AuNP biosynthesis
Liposomes	• Biomedical field - DDS, protection against enzymatic degradation of drugs, drug targeting, gene transfer • Food and nonfood applications – e.g. nutrient encapsulation & delivery, functional components encapsulation (proteins and enzymes, flavours, antimicrobials)

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NanoBiotechnology Research and Innovation

"Bridging the gap towards nanobiotechnology applications for a sustainable tomorrow"

"Ensuring a Sustainable Tomorrow"

INFORMM

INFORMM is the first multidisciplinary institute in USM and was borne from successes of medical biotechnology program in USM that met USM criteria for 'World Research Programs' in 2001. The idea for its formation was mooted with the intention of streamlining R-D-C-E in molecular medicine at USM. Its formation was tabled and approved by USM Senate on Dec 22nd 2002, by USM Council on 15th March 2003 and by the Ministry of Higher Education on Jun 1st 2003.

INFORMM performs fundamental as well as translational research in priority areas in molecular medicine in Malaysia. INFORMM has a vision to promote research and innovation in molecular medicine aimed at producing cutting-edge discoveries and technologies with high impact. INFORMM also trains K-workers. INFORMM perform research, development and commercialization under one entity and this enable it to market its innovation globally. Technology licensing is given to spin-off companies who are corporate partners of INFORMM.

The thrust at INFORMM is research and innovation in molecular medicine for diagnostic and therapeutic. INFORMM has focused on rapid diagnostic for typhoid, parathyphoid, cholera, filiriasis, tuberculosis and pharmacogenomic towards development of personalized medicine. The technology platforms used included dot enzyme immunoassays, ELISA, PCR including PCR-ELISA, thermostabilized PCR, immunochromatography, biosensors and biochips. It has relied on endogenous and outsourced technologies in its innovations. INFORMM has recently acquired new technologies and expertise in nano-biotechnology and antibody engineering. It has now strategies itself to take advantage of the new technologies and expertise to affect further innovations. Nano-biotechnology and antibody engineering has positioned INFORMM uniquely to further excellence. It is now well-positioned to develop new innovations and to improve established tests to produce more sensitive, specific and cost effective tests.

NanoBRI@INFORMM

NanoBiotechnology Research and Innovation is a team at the Institute for Research in Molecular Medicine (NanoBRI@INFORMM), Universiti Sains Malaysia (USM). NanoBRI@INFORMM is formed preceding technology transfer/ acquisition between USM, Malaysian Biotechnology Corporation (BiotechCorp) and Nanobiotix S.A. Paris, France. NanoBRI@INFORMM focuses on design and synthesis of multifunctional inorganic nanoparticles of specified size for various applications. With the combined development of biology, physics and chemistry of nanoparticles, new applications can be developed. To date, NanoBRI@INFORMM specialized in four types of nanoparticles synthesis and design namely NanoSilica, NanoMagnetic, NanoGold and Liposomes. Those nanoparticles have potential to create many new products and devices for wide-ranges of applications such as in biomedical, agriculture and energy production.

FOCUS AREAS

- Nanoparticles/Nanocolloids research and innovation
- Reagents design
- Drugs/Molecules carrier design and development
- Cellular imaging
- Diagnostic technologies

Activities:

Research and Innovation

- NanoBRI@INFORMM is actively engaged in R&I on nanotechnology for biotechnology applications.

Technology transfer

- NanoBRI@INFORMM offers technology transfer in synthesis of nanoparticles for biological applications.

Services

- NanoBRI@INFORMM specialized in characterization of nanoparticles including physical properties and in vitro analysis.

Consultancy

- NanoBRI@INFORMM provides consultation in synthesis and characterization of nanoparticles, stabilization of nanoparticles and applications in selective applications.

Contract Research

- Contract research provided by NanoBRI@INFORMM are :
  - NanoSilica for drugs/molecules delivery system e.g. small molecules, dyes, MAb, DNA etc
  - NanoMag for hyperthermia, fluid bearing, contrast agent, cell separation, tagging agents, nanodevices
  - AuNP: Diagnostic kits, contrast agent, inert coating, nanodevices
  - Liposomes: Drug delivery system, molecules carrier
  - Conjugation of nanoparticles to specific targets/ ligands/sites, for specific applications