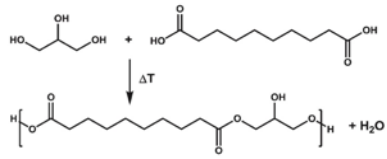
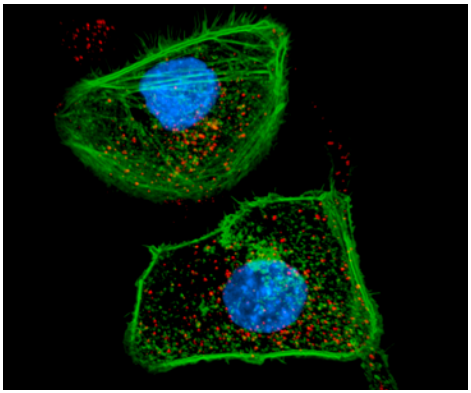
Poly(glycerol sebacate) nanoparticles for encapsulation of hydrophobic anti-cancer drugs; Bruno G. De Geest et al, Polymer Chemistry (2017), DOI: 10.1039/C6PY02192A

Bruno De Geest is Professor in Biopharmaceutical Technology at the University of Ghent. His interdisciplinary lab is working at the interface between materials chemistry and life science to design novel drug delivery systems and to investigate how these interact with living cells and tissues in vitro and in vivo. The two main focusses of the group are the design of nano/microparticulate vaccines and the design of new strategies for anti-cancer therapy.

Physical encapsulation of hydrophobic compounds into nanocarriers that are stable in aqueous medium is of high interest as it can increase solubility of the drug, lower its toxicity, control its pharmacokinetic profile and thus improve the overall therapeutic efficacy. In this paper, Bruno and co-workers, report the design of poly(glycerol sebacate) (PGS), an inexpensive water insoluble but biodegradable and biocompatible polymer, into nanocarriers for hydrophobic drugs.



Synthesis of poly(glycerol sebacate)



Confocal microscopy was carried out on a Leica DMI6000B inverted microscope equipped with a 63x 1.4 NA oil immersion objective and attached to an Aurox/Andor DSD2 confocal unit. Figure on the left shows a confocal microscopy image (maximum intensity projection) of SKOV-3 cells pulsed with Cy5-N3 labelled PGS nanoparticles (red). Cell membrane was stained in green with phalloidin-AlexaFluor488. Cell nuclei were stained in blue with Hoechst.

The study shows that PGS is capable of forming well defined nanoparticles and that the produced PGS nanoparticle dispersion is stable in aqueous medium. Further studies are now needed to assess if PGS nanoparticles could serve as a nanomedicine platform for physical encapsulation of hydrophobic drugs.

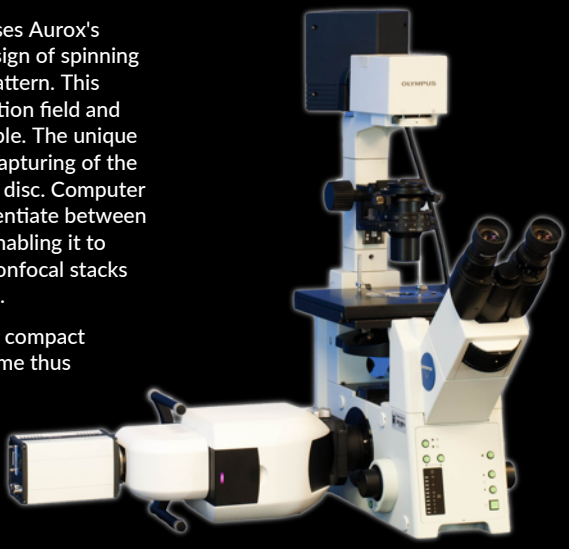
"The Aurox system allows a fast multi-color image acquisition at high speed and in multiple dimensions. Therefore it is particularly well suited for us to investigate the interaction between nanoparticles and living cells, including dendritic cells and cancer cells"

Prof. Bruno De Geest

AUROX

CLARITY LFC

The Aurox Clarity Laser Free Confocal unit uses Aurox's patented optical system based on a novel design of spinning disc with a grid-like structured illumination pattern. This pattern is used to both modulate the illumination field and demodulate the light emerging from the sample. The unique optical system inside the Clarity LFC allows capturing of the images both transmitted and reflected by the disc. Computer processing of these images allows it to differentiate between in-focus and out-of-focus information thus enabling it to extract optically-sectioned images, capture confocal stacks and render 3D images of fluorescent samples.



The Clarity product has been engineered as a compact attachment to a conventional microscope frame thus allowing for flexible, highly cost-effective upgrade solutions. All major microscope frames are supported, as well as sCMOS cameras from PCO and Andor, light sources from CoolLED and Excelitas, Solent incubators and Prior translation stages. The system ships with Aurox Visionary, a dedicated image acquisition software package designed for ease of use, streamlined hardware control and multi-dimensional data acquisition.

KEY SPECIFICATIONS

Confocality:	0.6 µm (FWHM) with 1.4 NA oil objective
Min exposure:	20 ms
Max frame rate:	22 fps (12-bit confocal, 2.3 MP, no binning) 50 fps (with 2x2 binning)
Imaging channels:	4 user-replaceable filter cubes on an internal turret
Channel switching:	<200 ms
Excitation range:	370 - 700 nm
Emission range:	410 - 750 nm
Data format:	OME TIFF with full image metadata

THE COMPANY

Aurox Ltd was established in 2004 to commercialise and build upon pioneering work from the Scanning Optical Microscopy Group at the University of Oxford. A leader in the design and manufacture of innovative optical equipment, the company has won multiple business and technology accolades such as the Queen's Award for Enterprise and the Institute of Physics Innovation Award. Aurox's product line includes stand-alone instruments for fluorescence microscopy as well as imaging engines used in slide scanners (in collaboration with 3DHistech) and materials microscopes (with Carl Zeiss).