

## The use of multiphoton microscopy for assessment of absorption of selected chemicals in skin

*Xin Zhao, Dr. Andrei Zvyagin, Prof. Michael Roberts, University of Queensland,  
4067QLD, Australia  
[xinz@itee.uq.edu.au](mailto:xinz@itee.uq.edu.au)*

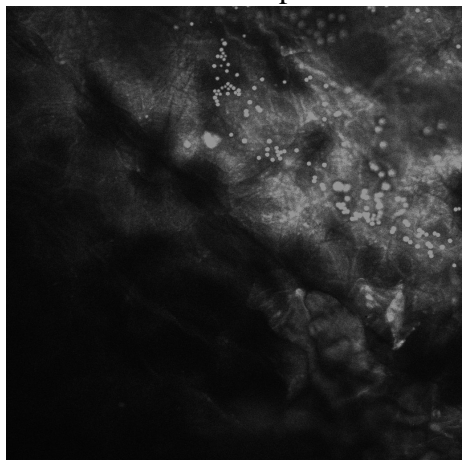
**Background: Skin** drug delivery has been a popular and important research topic in recent years. My project is focus on two aspects: one is the investigation of kinetics of various drug delivery pathways by way of direct imaging of penetrating drug agents on the morphological backgrounds of cellular structure of the skin: the other one is the study of biological pathways of penetration of environmental toxins through the skin (micron/nano particles).

### Outcomes:

- Kinetics of dye diffusion (Fluorescein sodium PH controlled solution) in epidermis in 3D- MPM(multiphoton microscope) dynamic dye diffusion
- ZnO nanoparticles (28-30nm) penetration into and distribution on full thickness skin (epidermis and dermis)

### Progress to date:

Using multiphoton (Olympus BX50) and single (Zeiss 510) photon microscope, good images have been obtained. Properties of fluorescein sodium and kinetics of dye diffusion has been explored.



Images obtained by multiphoton (left) and single photon microscope (right), the dots in the image is  $2\mu\text{m}$  fluorescent microsphere used as a non diffusion marker. The fluorescein sodium diffused from inside the microsphere edge to outside with time.

### Things still need to do:

- Construct the 3D module of dye diffusion in skin and some processed results from the images
- Results from ZnO penetration into skin

### Timeline:

All the results should be obtained by the end of this year and published hopefully next year.

