

Lecture 17: Assessing nanotoxicity at the single cell level

- I. Outline – the need for single cell measures of nanotoxicity
 - A. There is more than one way for a cell to die...
 - B. "Necrosis" vs. "Apoptosis"
 - C. There are other forms of "toxicity"
 - D. Some other challenges in measuring toxicity of nanomaterials
- II. Necrosis vs. Apoptosis mechanisms
 - A. Necrosis is unplanned "cell injury"
 - B. Apoptosis is planned "programmed cell death"
 - C. Why it is important to distinguish between necrosis and apoptosis
- III. Single cell assays for necrosis and apoptosis
 - A. Dye exclusion assays for necrosis
 - B. TUNEL assays for late apoptosis
 - C. Annexin V assays for early apoptosis
 - D. COMET assays for DNA damage and repair
 - E. Light scatter assays
- IV. Nanotoxicity in vivo – some additional challenges
 - A. Single cell nanotoxicity, plus....
 - B. Accumulations of nanoparticles can change toxicity locally to tissues and organs
 - C. Filtration issues of nanoparticles – size matters – toxicity to liver and lung

References

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