Course Content

The number of materials and devices produced using nano technology is rapidly growing. With recent advances in the field, nano materials and nano particles start to be widely used in all fields of life. In order to avoid eventual health problems, documentation of the effects of nano particles and materials on organisms and cells is of utmost importance. During the nanotoxicology course, the effects of nano particles and materials on human health and, stress, disease and death responses of the organisms and cells to nano particles and materials will be analyzed and discussed from a molecular biology perspective. Nano particles/materials in industry and in the environment, methods to study nanotoxicology, organismal responses to nanomaterials, entry-uptake, faith of nano particles in cells and cellular and molecular stress and death responses against them will be covered during the course.

Assessment Methods and Criteria

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Course Outline
Week Subject
1-2 Introduction to Nanotechnology and Nanomedicine
Nanodevices and Nanomaterials
Major problem in treatment of many diseases
Advantages of Nano-delivery Systems
3 Designing Nanoparticles for Therapeutics
Types of Therapeutic Nanoparticles
Type of Nanostructured Nanoparticles
Nanocrystalline Particles in Nanomedicine
4 Nanotoxicity and human health
Fate of nanomaterials in the body: short term and long term effects
5 Determination of Toxicity
In vitro and in vivo study of the effect of nanoparticles on mammalian cells and tissues
6 Characterization Methods of Nanoparticles
DLS, TEM, SEM etc.
7-14 Current Application of Nanoparticles in Clinics
Nanoparticles for Cancer Therapy
Nanoparticles for Infectious Disease Therapy
Nanoparticles for Autoimmune Disease Therapy
Nanoparticles for Cardiovascular Disease Therapy
Nanoparticles for Neurodegenerative Disease Therapy
Nanoparticles for Ocular Disease Therapy
Nanoparticles for Pulmonary Disease Therapy
Nanoparticles for Regenerative Therapy