

# Nanoparticles and Surface Chemistry Oncology

## **At the academic level:**

1. Modelling help us to predicting (electronic, magnetic , optical and mechanical) properties of materials, not yet available.
2. Modelling help us to understand and explain the gap/difference between the bulk material properties and their nanoscale counterparts. For example, the interaction between nanoparticles and bio-organism is surface chemistry specific process.

## **At the Industrial level**

1. Modelling help us to design a sound process to synthesis and also quality control in the production process.
2. Modelling help us to shorted the time to the market.
3. Modelling help us to design the materials with customer preference. For example, nanoscale roughness of the surface has a close relationship with the sensory organs of human, such as tactile perception for example.

# Fundamentals of link between human sensory organs and material properties

- In order to elaborate the mesoscopic property of nanomaterials, elaboration of physics and chemistry, synthesis, surface modification and assembly (aggregation) of nanoparticles must be adequately analyzed at all scales.
- In order to establish link between the material properties and human interaction, material science must marry with human psychology and underlining link must be found, designed and modelled.
- A modelling of surface with different texture, helps us to create a surface that costumer like.

# Nanoparticles interaction with biological system

## **Question**

How can we contribute to the development of test methods that do not involve animal testing? They are clearly preferable on ethical grounds, but also offer opportunities for faster and easier development of pharmaceuticals.

## **RISE's contribution**

RISE (former SP) is the only Swedish laboratory to be given membership of EU-NETVAL, a European network of laboratories for validating animal-free test methods. RISE's cell culture laboratory has also been approved to Good Laboratory Practice, an international quality system.

## **Result**

As a member, RISE is contributing to the development of reliable test methods that do not involve animal testing.

Simplicity of the technology is well documented. However,

Underlining fundamental understanding and modelling is lacking.

# Nanotechnology areas within RISE

RISE has broad competence in modelling, characterization and processing of nanomaterials, including nanoparticles

## **NANOMATERIALS**

Synthesis, processing and implementation of nanomaterials in products , nanocomposites and device integration

## **SAFETY**

Including "safe by design", health and environmental impacts of nanomaterials.

## **PILOT SCALE ACTIVITIES**

Nano crystalline cellulose – NCC  
Nano fibrillated cellulose – NFC  
ProNano initiative

## **CHARACTERIZATION**

Including standardization, metrology and infrastructures like ESS and MAXIV