Innovative Nanomaterialen - Risiken und Anwendungen

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Bio-Nanomaterials: Research topics

- Control synthesis
- Shape/Surface
- Defined biological systems
- Nanomaterial-cell interactions - realistic conditions
Bio-Nanomaterials: Research topics

- Basic research
- Risk assessment
- Study of diseases
- Drug development
Basic research – shape / surface effects

C. Kinnear, L. Rodriguez-Lorenzo, D. Vanhecke
Basic research – shape / surface effects

- Control synthesis – surface/shape – uptake and cell responses

➤ Surface ligand is the key parameter

C. Kinnear, L. Rodriguez-Lorenzo, D. Vanhecke
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Bio-printing platform to manufacture lung tissue

The air-blood tissue barrier

- Alveolus (Air)
- Epithelium
- Basal lamina
- Endothelium
- Red blood cell
- Capillary

P. Gehr
Anatomie Bern

C. Jud, L. Horvat, Y. Umehara

Our 3D printer: BioFactory®

Pictures provided by regenHU

C. Jud, L. Horvat, Y. Umehara
Cell printing

Endothelial cells (EA.hy926) printed on Matrigel

- Reproducible (lung) cell culture systems are needed for **low-cost** and **screening** studies

- **Lung endothelial cells** can be **printed** on matrigel

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Control synthesis

Defined biological systems

Material-cell interactions in realistic conditions
Biokinetic studies of liposomal ciclosporin A *in vitro*

- Realistic *in vitro* systems to *mimick inhalation* of drugs
  - **No adverse effects of CsA** in lung cells when exposed at the air-liquid interface
  - **Constant CsA level** inside cells over 24h

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