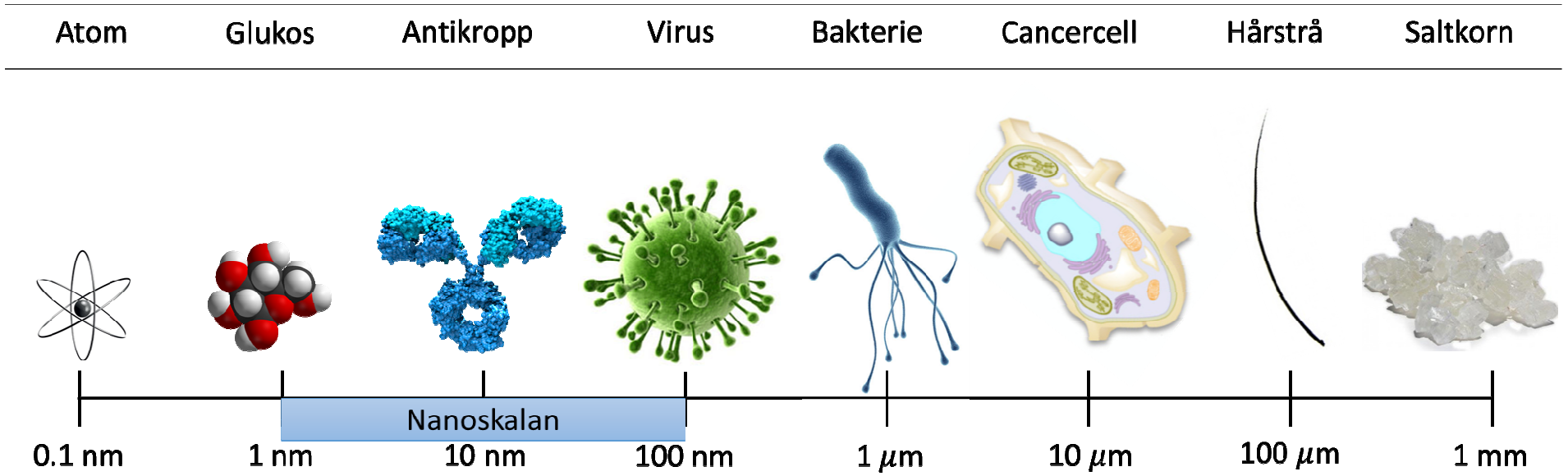
An Interdisciplinary Approach to Evaluate the Toxicity of Metal Oxide Nanoparticles in Human Monocytes and Plasma

A Pilot Study

AMM Höstmöte, 2018-11-14/15, Maria Assenhöj

Region Östergötland

Nanoskalan



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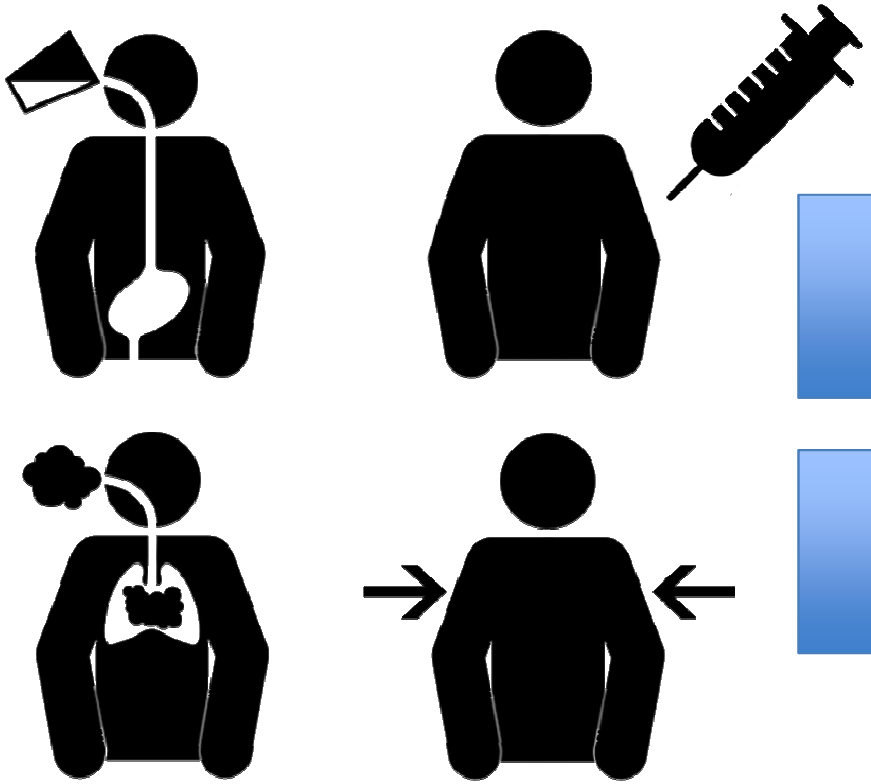
Exponering

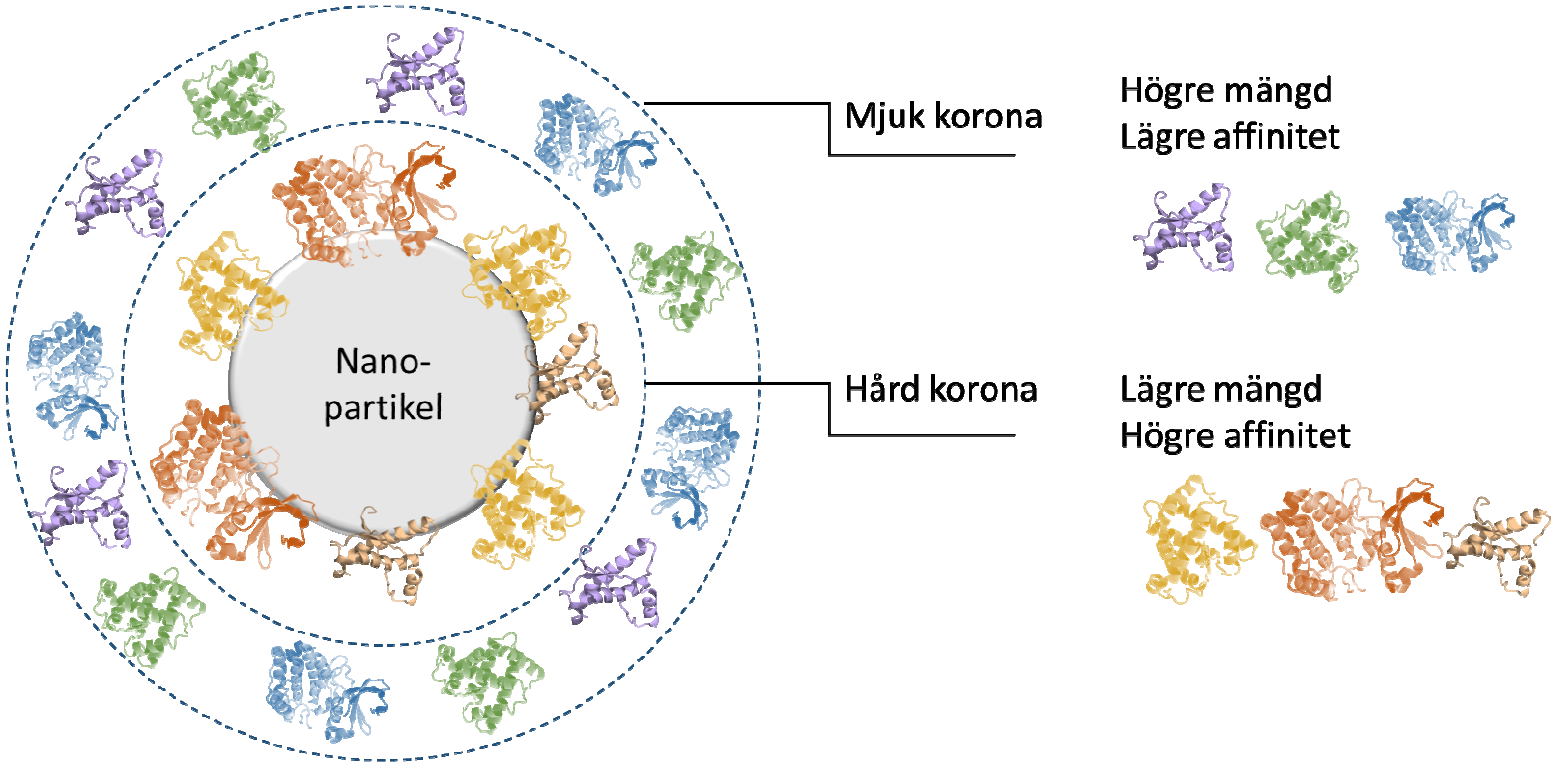


År 2020
6 miljoner arbetare

Nya egenskaper
= Nya hälsorisker

Proteinkorona

Nanopartikelns ”biologiska identitet”



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Partikelkarakterisering

Co_3O_4

Fe_2O_3

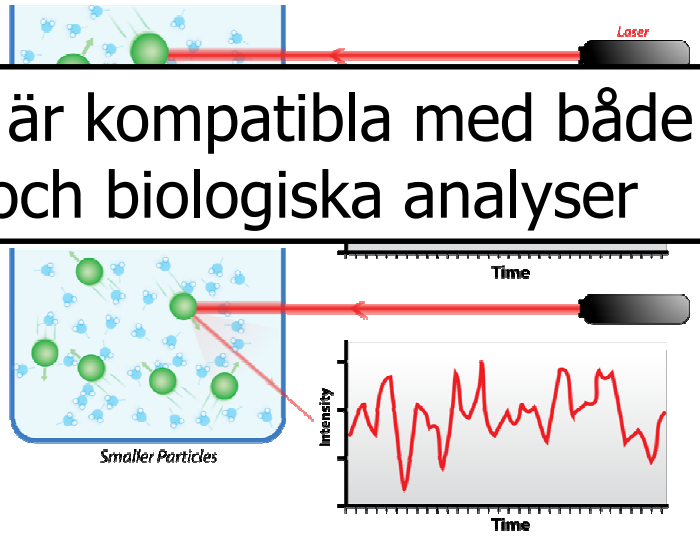
Vi behöver buffertar som är kompatibla med både partikelkarakterisering och biologiska analyser

CeO_x: Gd5%

CeO_x: Gd14%

Medicinsk tillämpning

Dynamic light scattering (DLS)



Source: Dynamic light scattering. In: Wikipedia [Internet]. 2018 [cited 2018 May 31]. Available from: https://en.wikipedia.org/w/index.php?title=Dynamic_light_scattering&oldid=841198967

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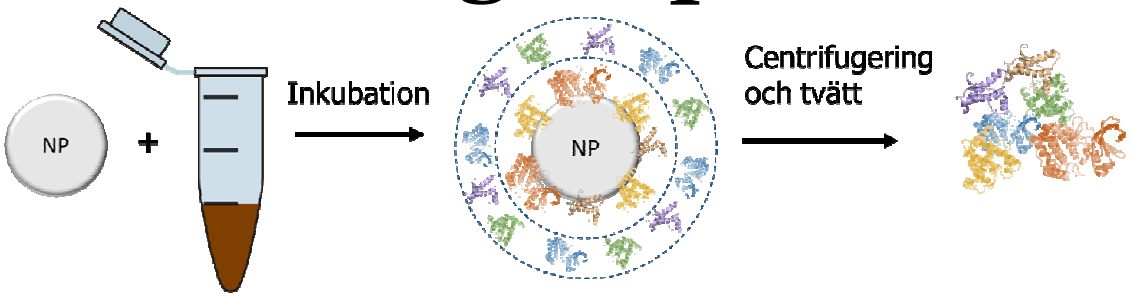
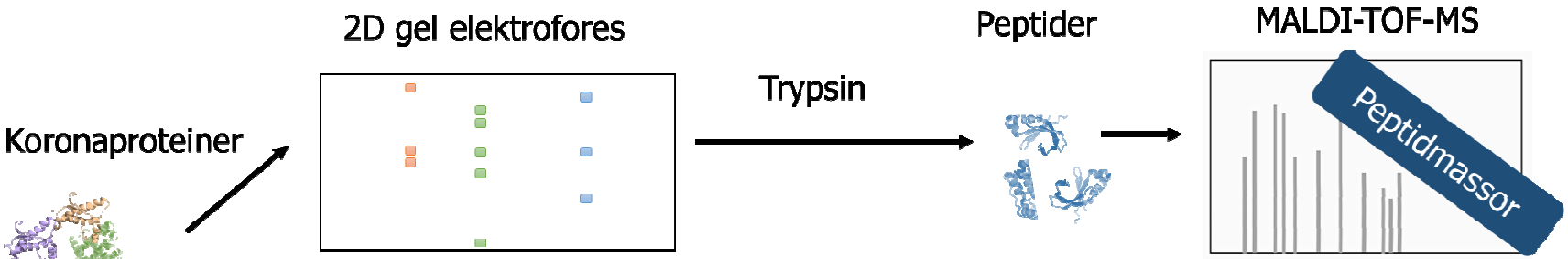
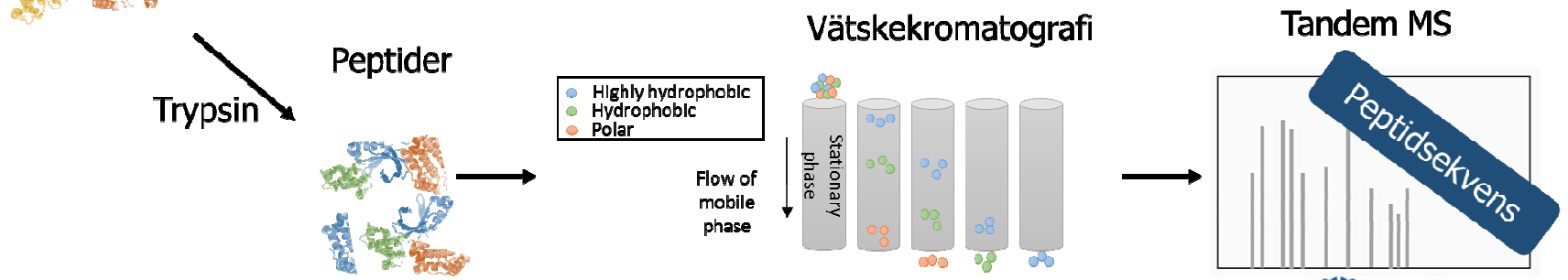
Identifiering av proteinkorona



Approach 1: peptide mass fingerprinting



Approach 2: shotgun proteomics



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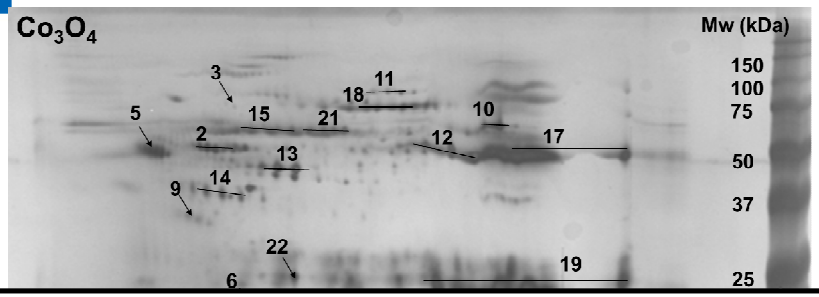
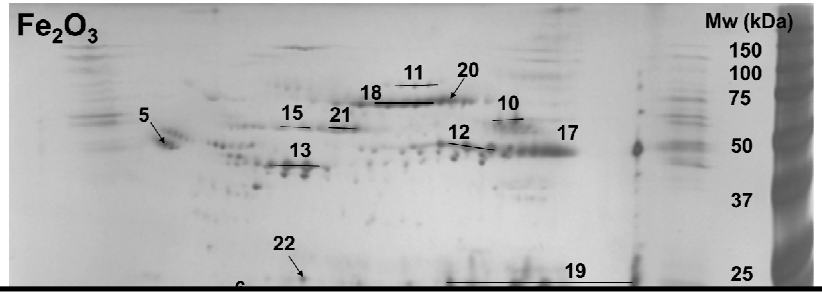
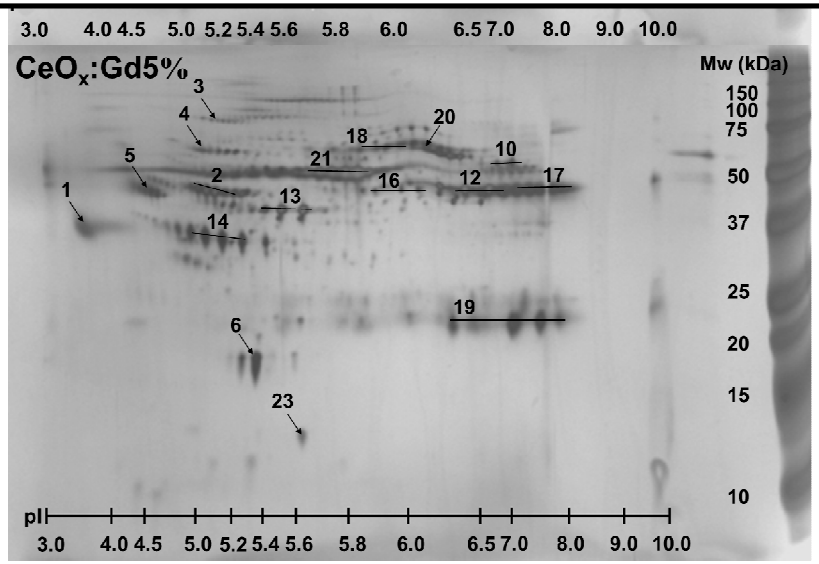
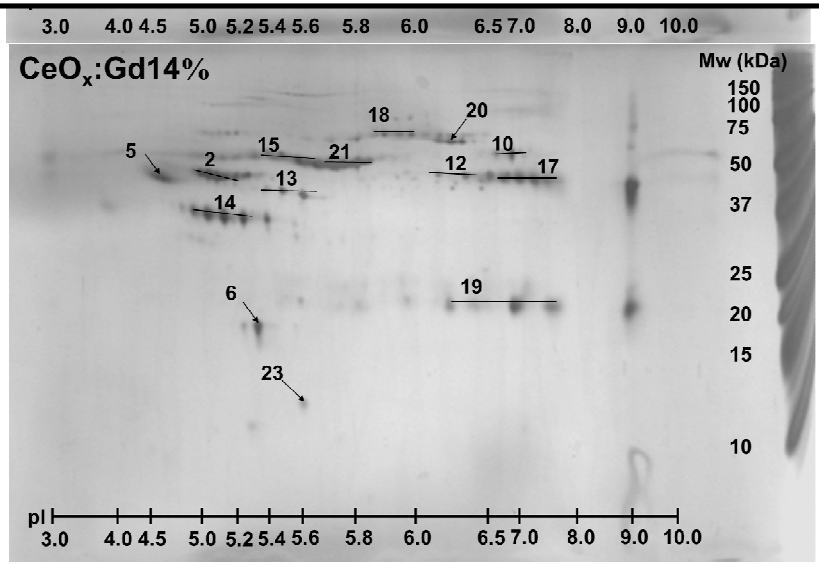




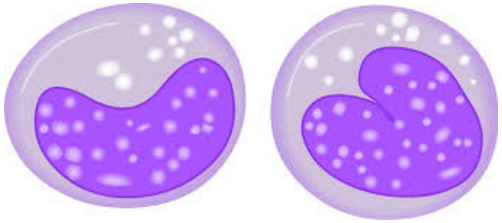
Koronaproteiner mestadels involverade i immunologiska och inflammatoriska processer





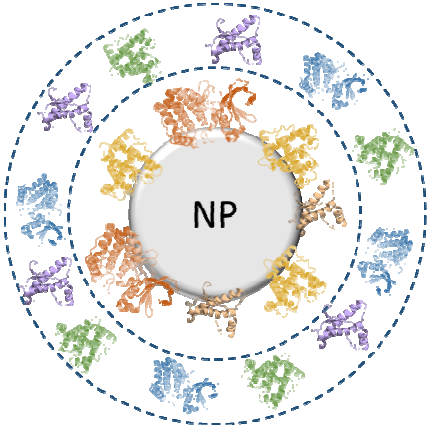
Immunogenicitet

Monocyter



+

NP med korona



- Viabilitet
- Cytokiner = danger signal

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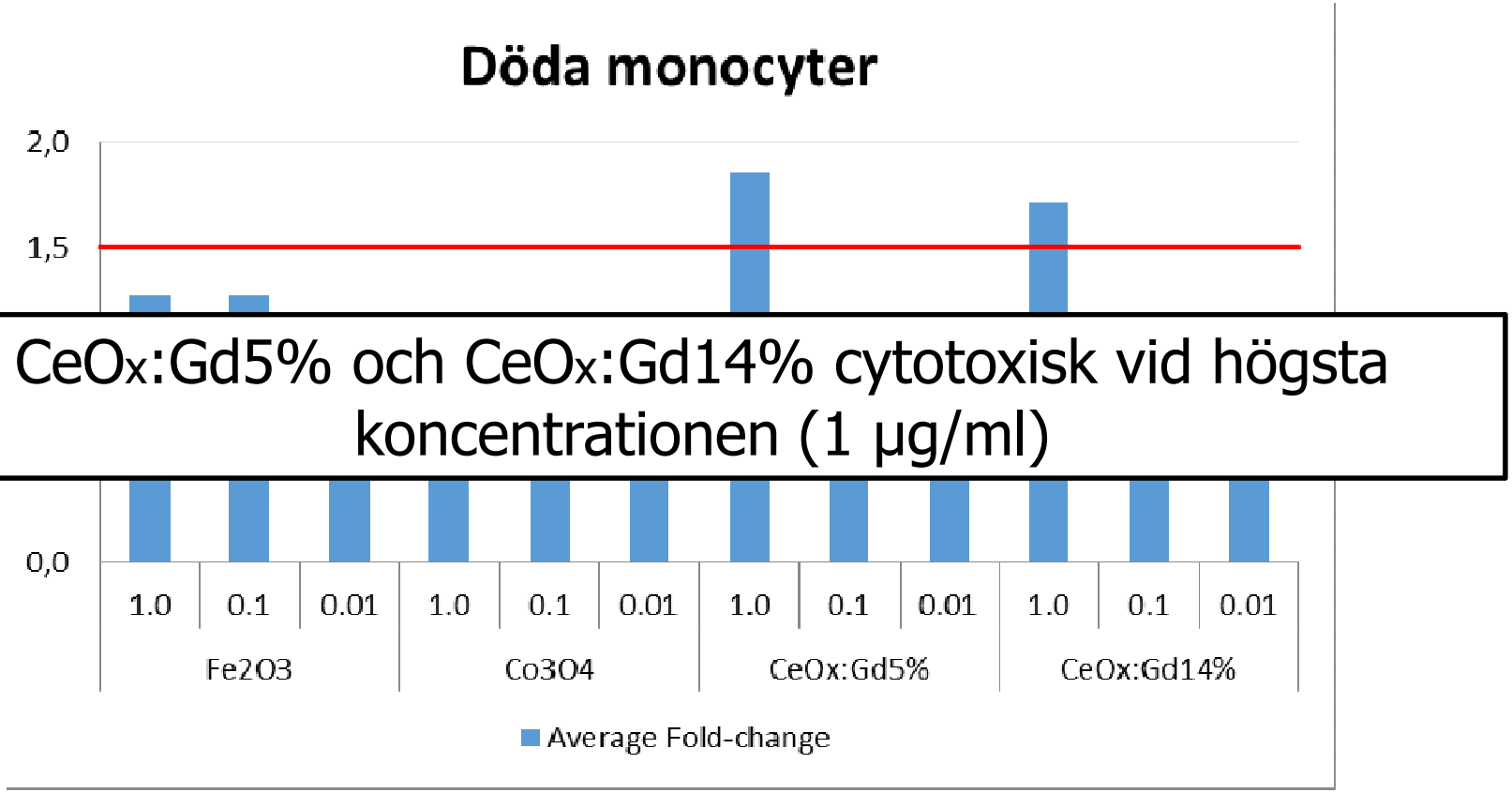
Immunogenicitet -viabilitet



CeOx:Gd5% och CeOx:Gd14% cytotoxisk vid högsta koncentrationen (1 µg/ml)

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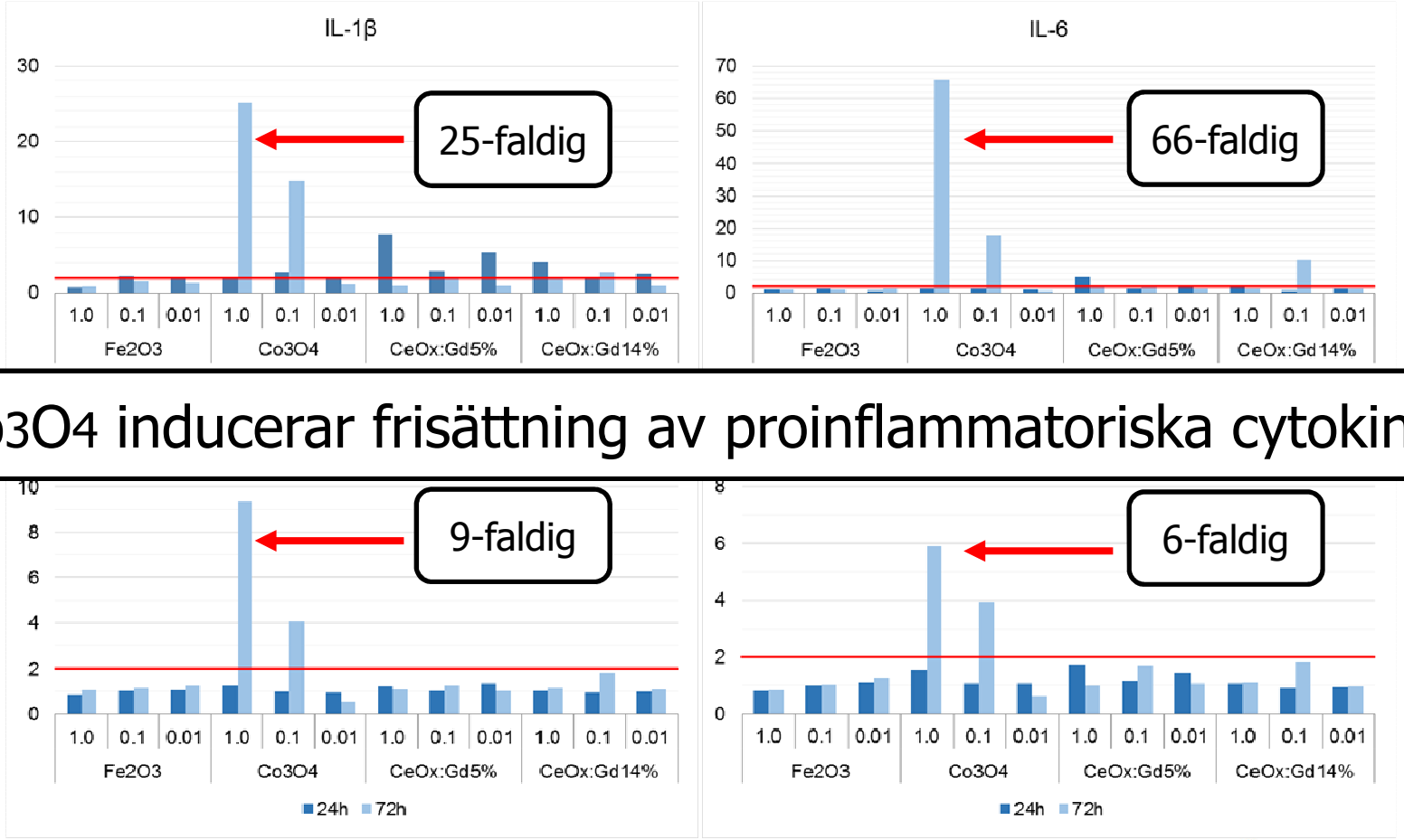
Immunogenicitet – Cytokiner



Co_3O_4 inducerar frisättning av proinflammatoriska cytokiner

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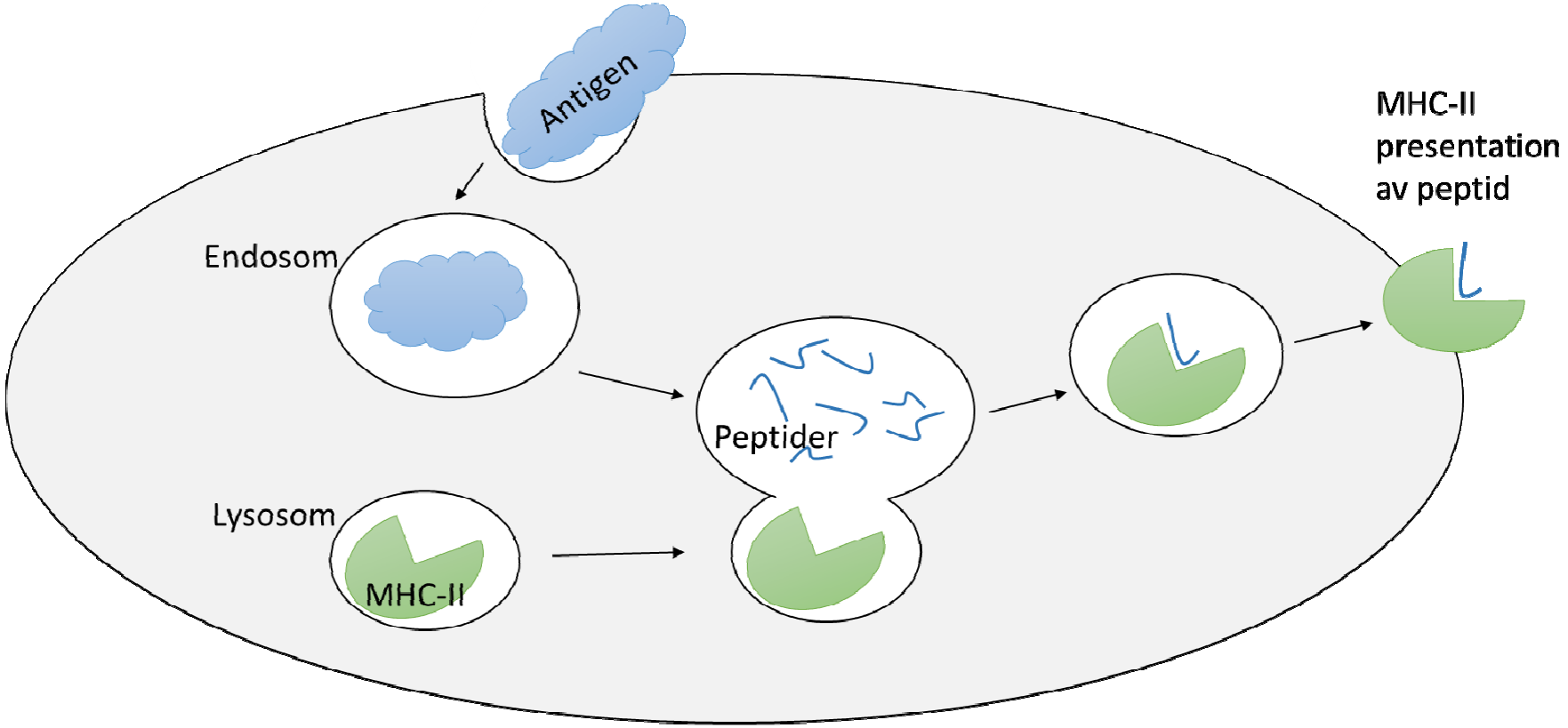
Immunogenicitet – MHC II Epitopscreening



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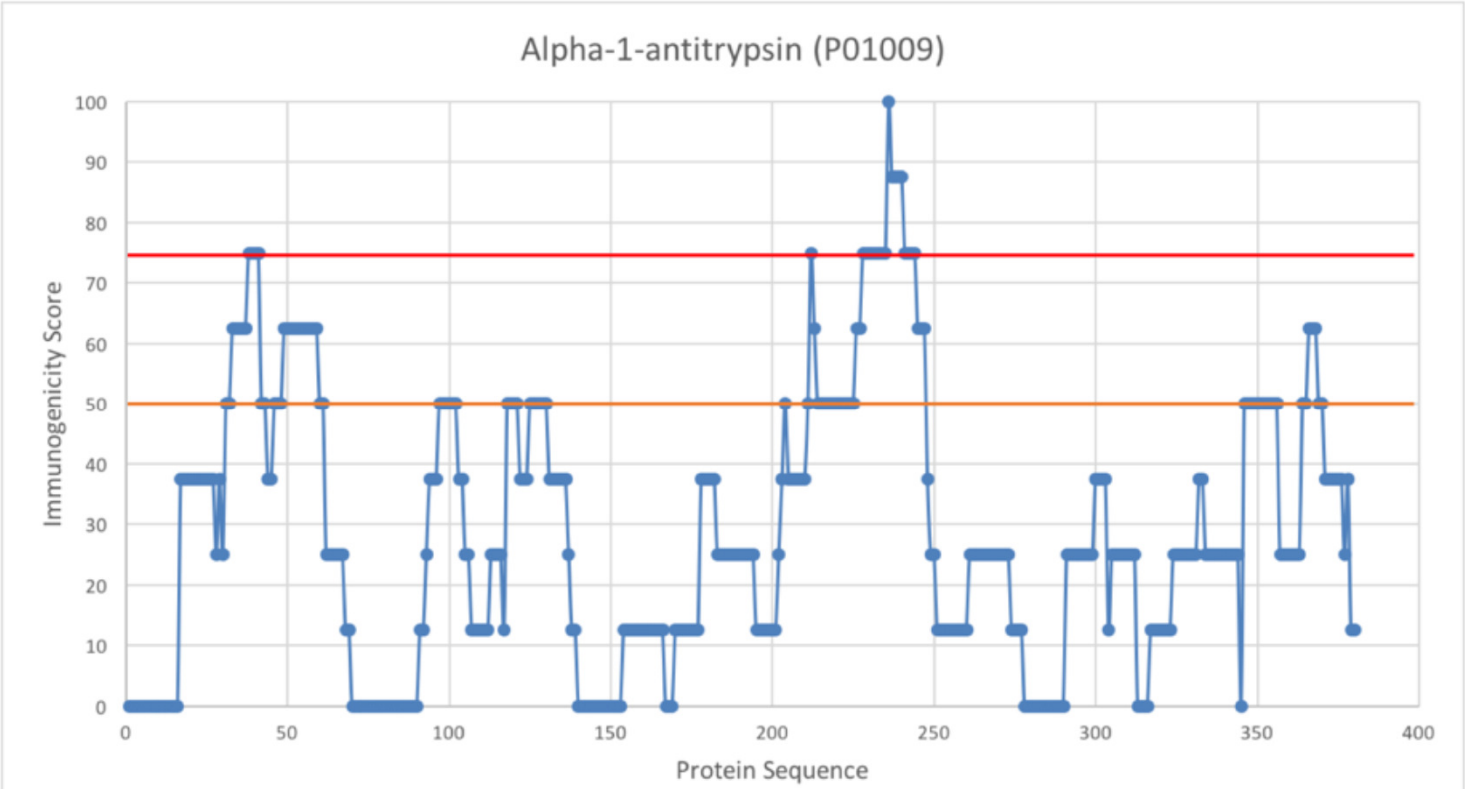
Immunogenicitet –MHC II Epitopscreening



Risk för oönskad immunrespons mot kroppsegna proteiner

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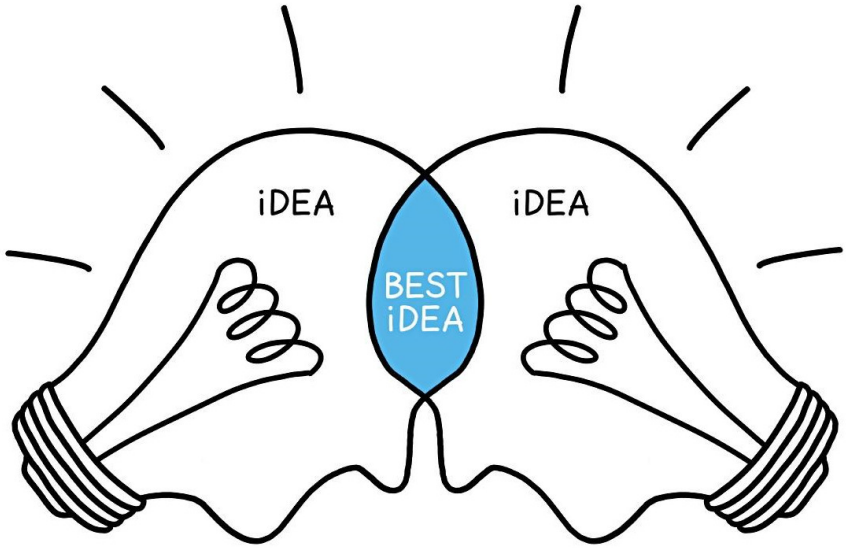
Slutsatser

- Möjligt tillvägagångssätt för att utvärdera nanopartikel-toxicitet
- Det finns moment som behöver optimeras
- Tvärvetenskapligt samarbete nödvändigt



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Tack för att ni lyssnade!

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