

Assessment of non-displaceable binding for radiotracers on tissue-mimicking scaffolds

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Affinity Chromatography

State of the art method for **lipophilicity** and **plasma protein binding** estimation

Stationary phase is **highly adaptable** to the purpose in **high throughput mode**

Limited predictive power for in vivo applications

Biomedical Engineering

Artificial extracellular matrix allows **3D tissue generation** close to in vivo systems

Holistic and un toxic system for cell proliferation in 3D arrangement

Chemically modifiable to mimic features of specific tissues

meets

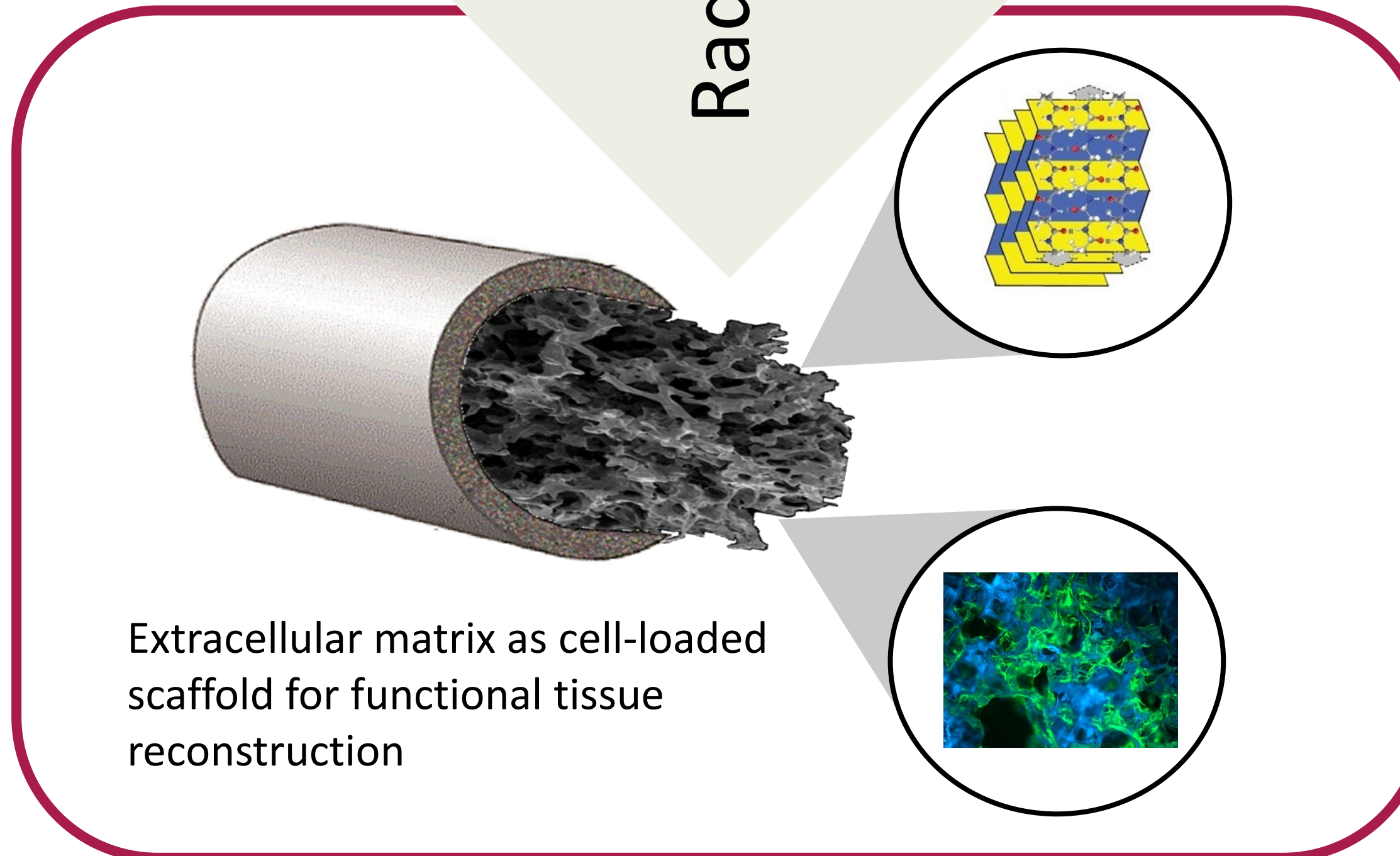
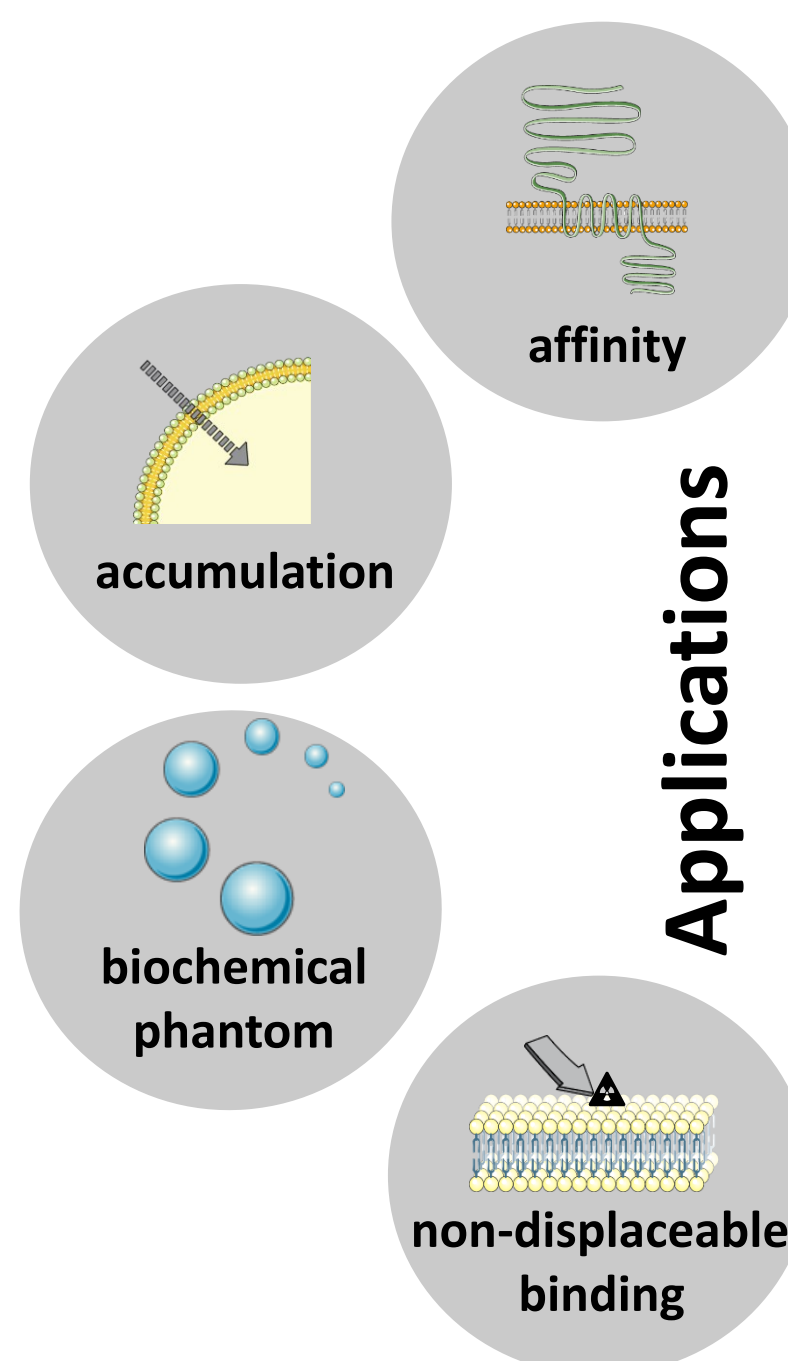
Radiobiology

1

Chromatographic-like set up including automatic pump system enables **high-throughput analysis** and **low radioactive dose**.

2

Dynamic flow system transports the radiotracer to the cells **simulating bloodflow** and **facilitates distribution**

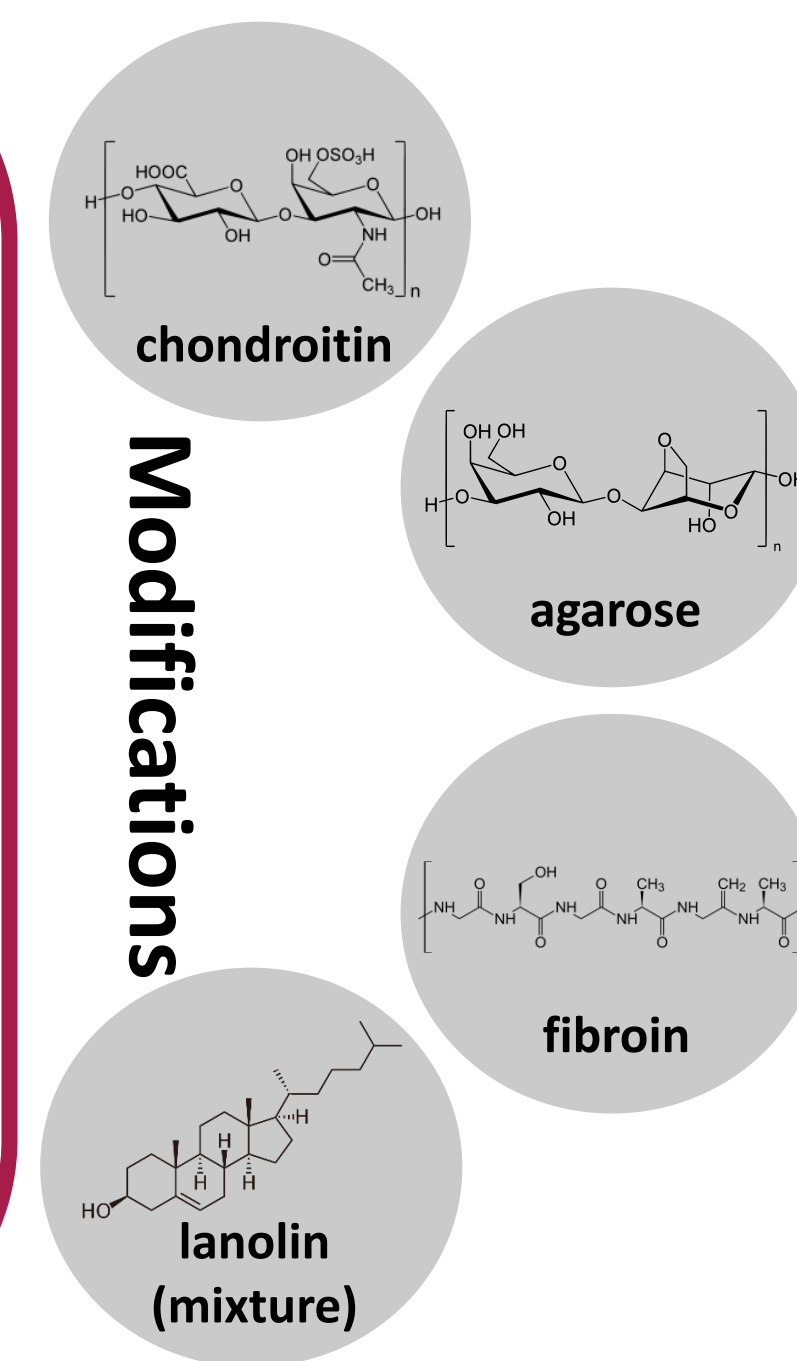


3

Radiotracer interaction with artificial extracellular matrix allows **lipophilicity** and **non-displaceable binding** estimation beyond logP

4

Open up the possibility to **reduce, refine and replace (3Rs)** animal testing to evaluate non-displaceable binding.

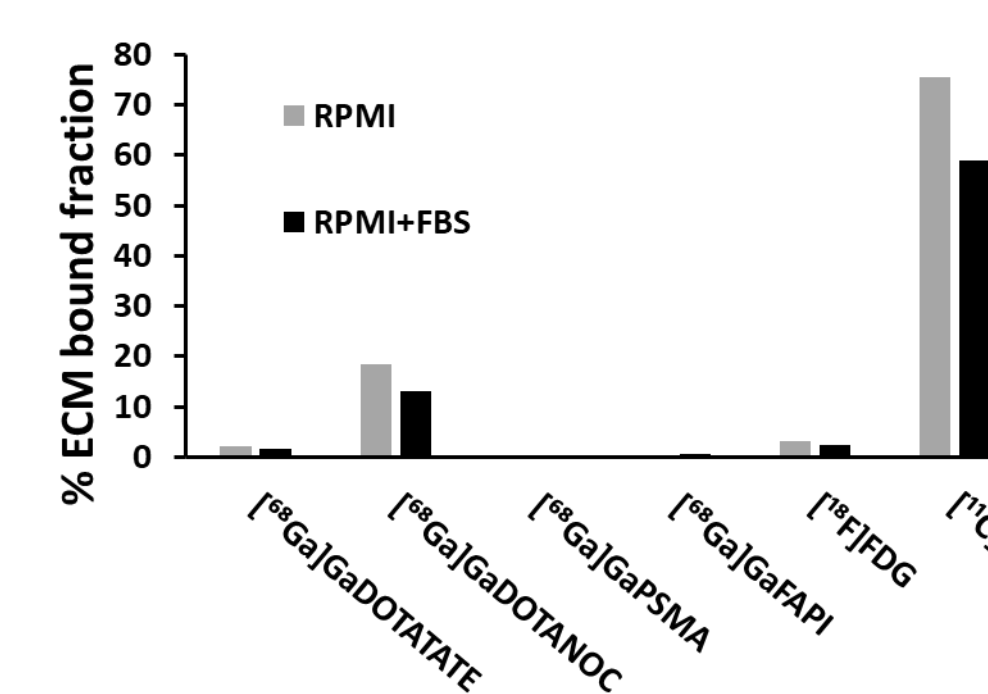
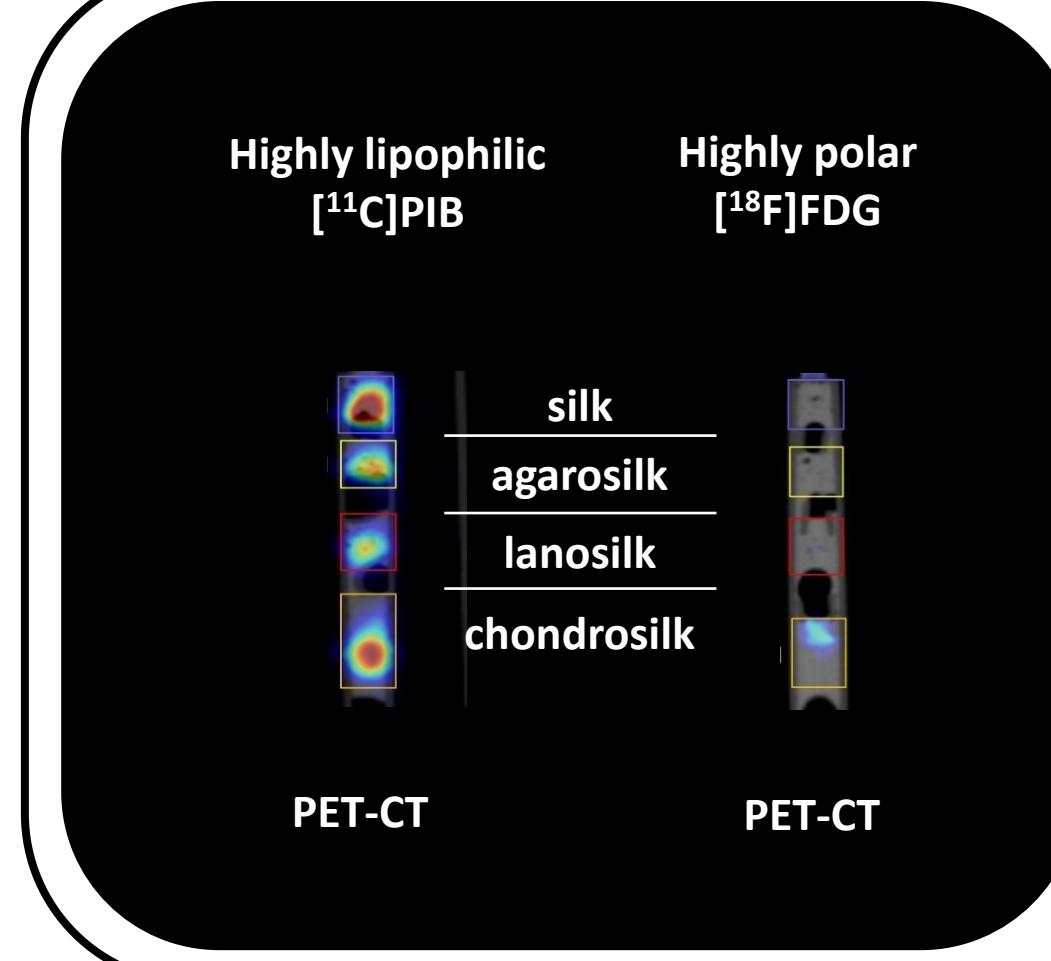
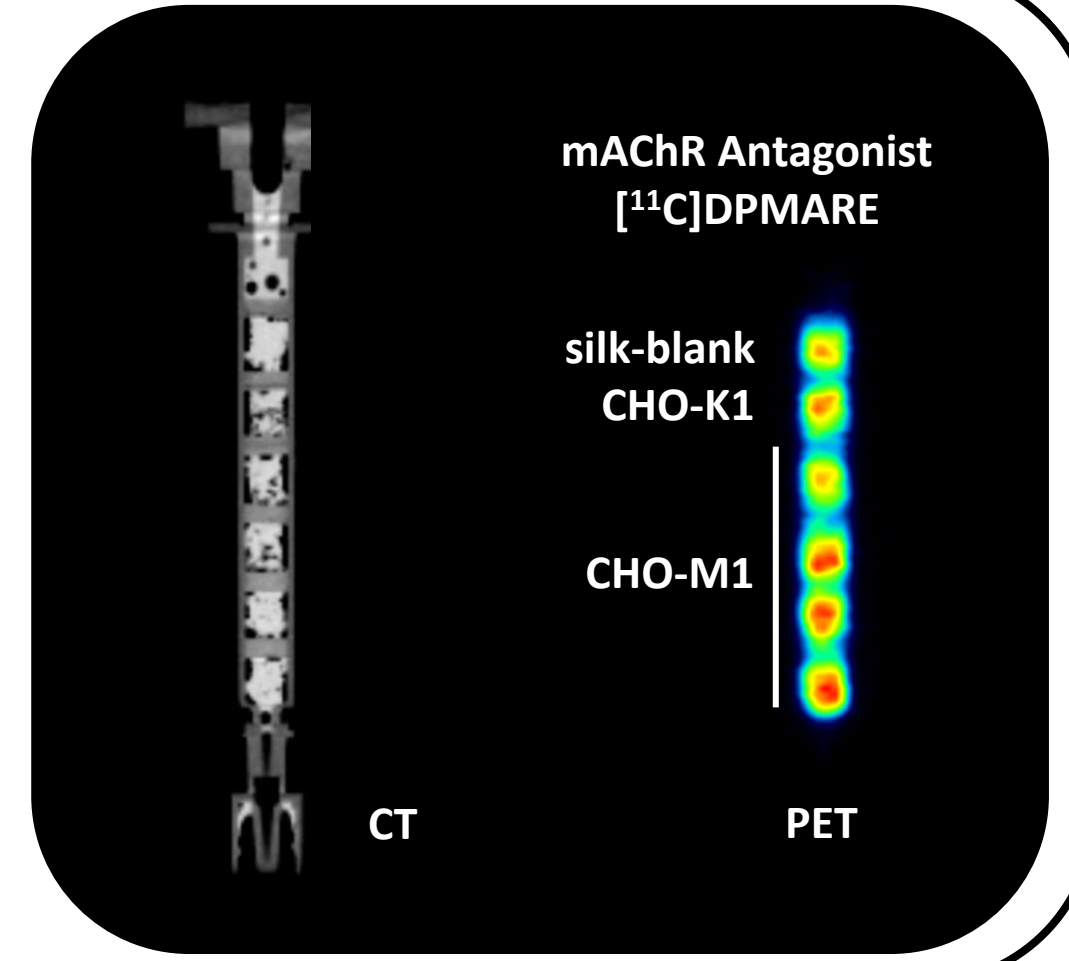
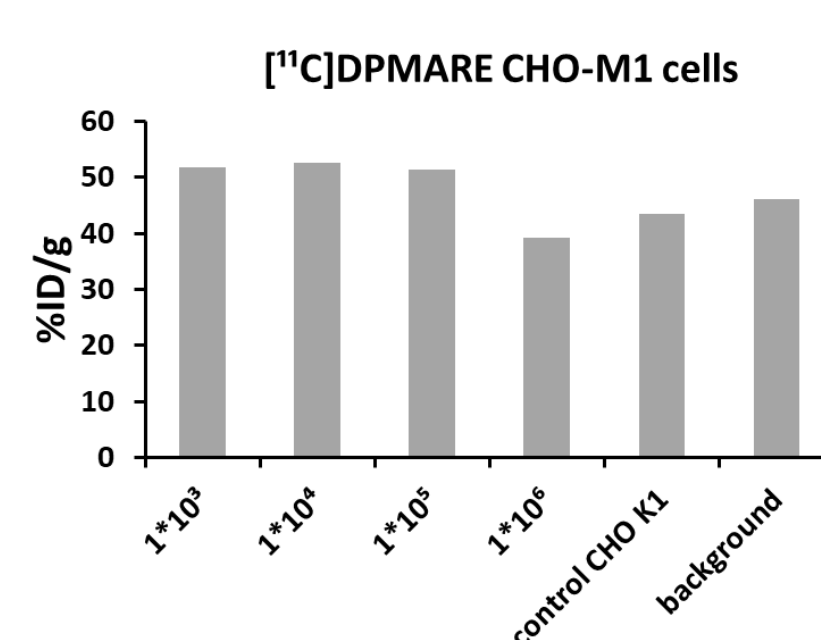


Cell-based assays

Estimation of non-displaceable binding to cellular components

Radiotracer fail due high non-displaceable binding. Exclusion criteria for further development into in vivo studies

[¹¹C]DPMARE has to high non-displaceable binding for further development



Cell-free assays

Estimation of non-displaceable binding to artificial extracellular matrix w/o plasma proteins

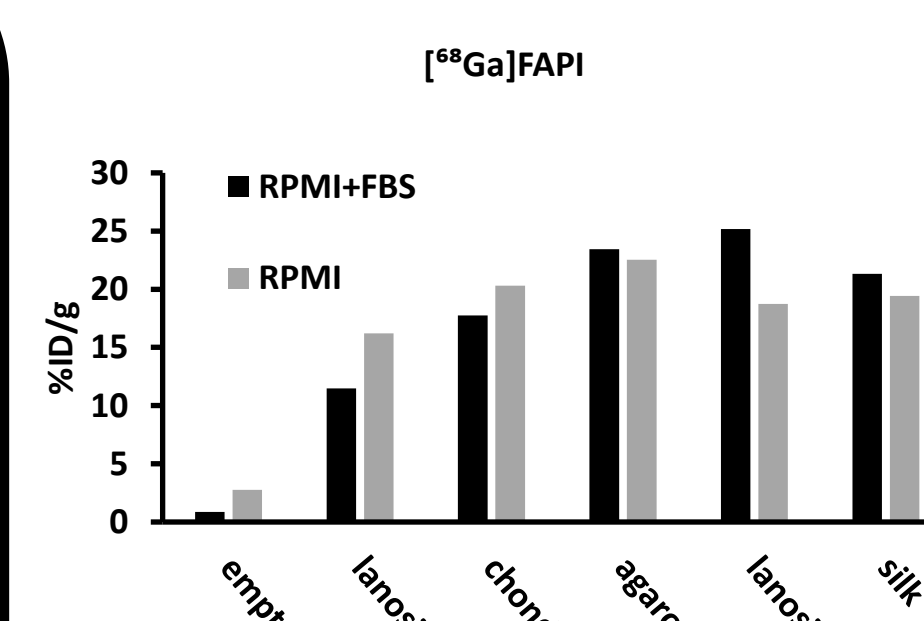
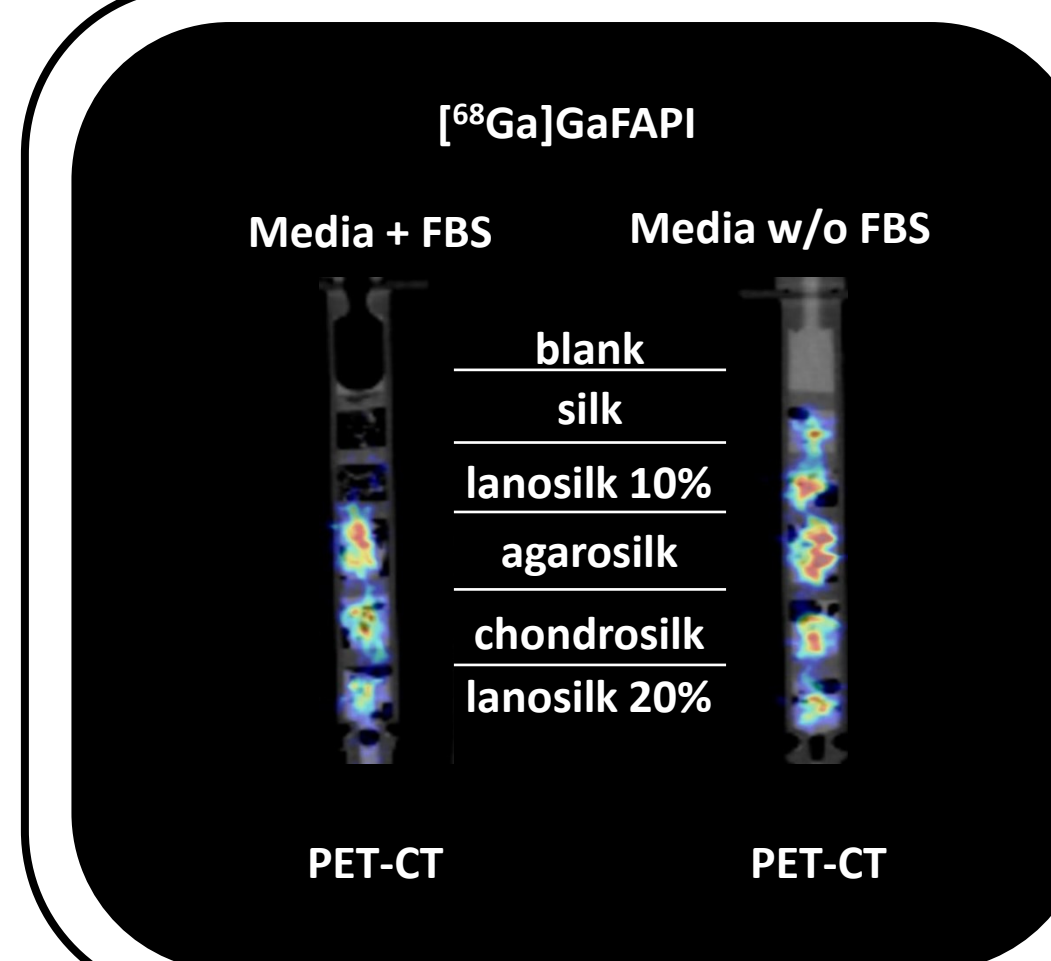
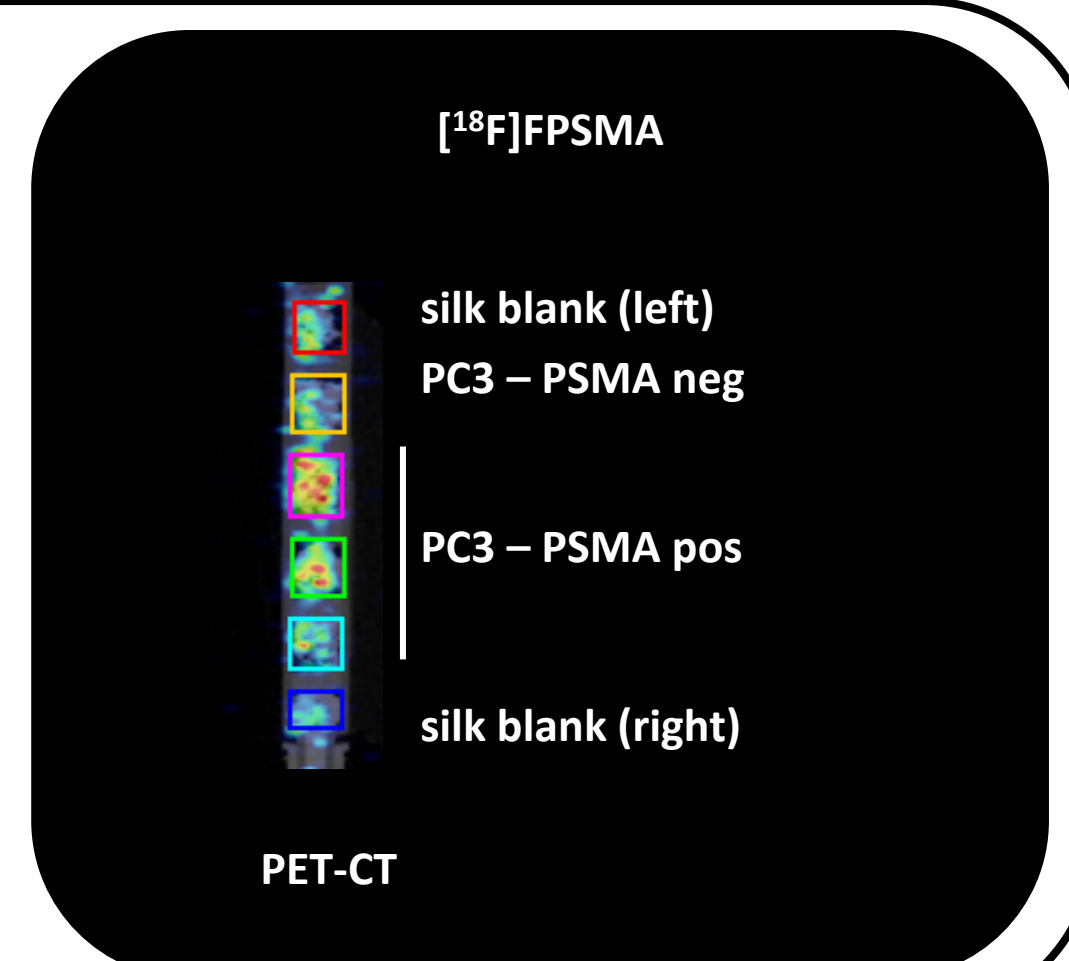
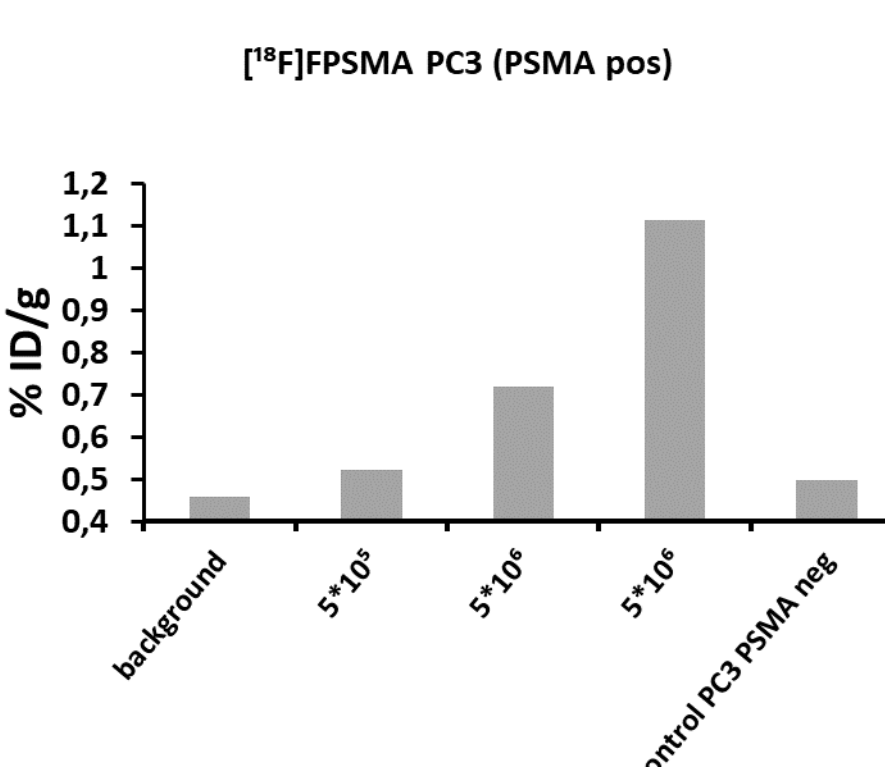
Analysis of dependency of plasma protein binding and non-displaceable binding

Highly lipophilic radiotracer show reduced non-displaceable binding in presence of plasma proteins

Estimation of binding affinity for radio-tracer with low non-displaceable binding

Linear correlation of radiotracer interaction with cellular and non-cellular components

Quantifiable [¹⁸F]FPSMA signal allows precise image analysis.



Advancement of artificial extra-cellular matrix with increasing complexity

Silk modification increase or decrease polarity to determine magnitude and intensity of intermolecular forces

Modification towards an increasingly lipophilic scaffold increases also the non-displaceable binding of [⁶⁸Ga]GaFAPi

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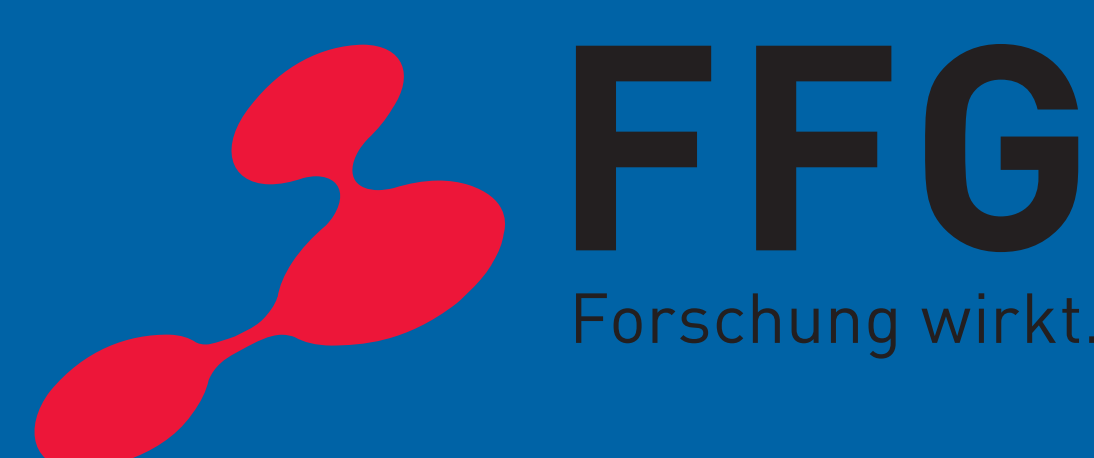
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Figures are downloaded for free via <https://smart.servier.com/>
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References:

Pichler, V., WO2019185565A1, Device and Method for Micro-PET or Micro-SPECT of a cell culture.

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