

Interstitial fluid sampling with open flow microperfusion for investigation of protein binding in tissue

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PURPOSE

BACKGROUND

- Drug development requires quantification and protein binding analysis in tissue fluids.
- Few reliable methods and alternatives (lymph) for sampling of tissue fluids are available.

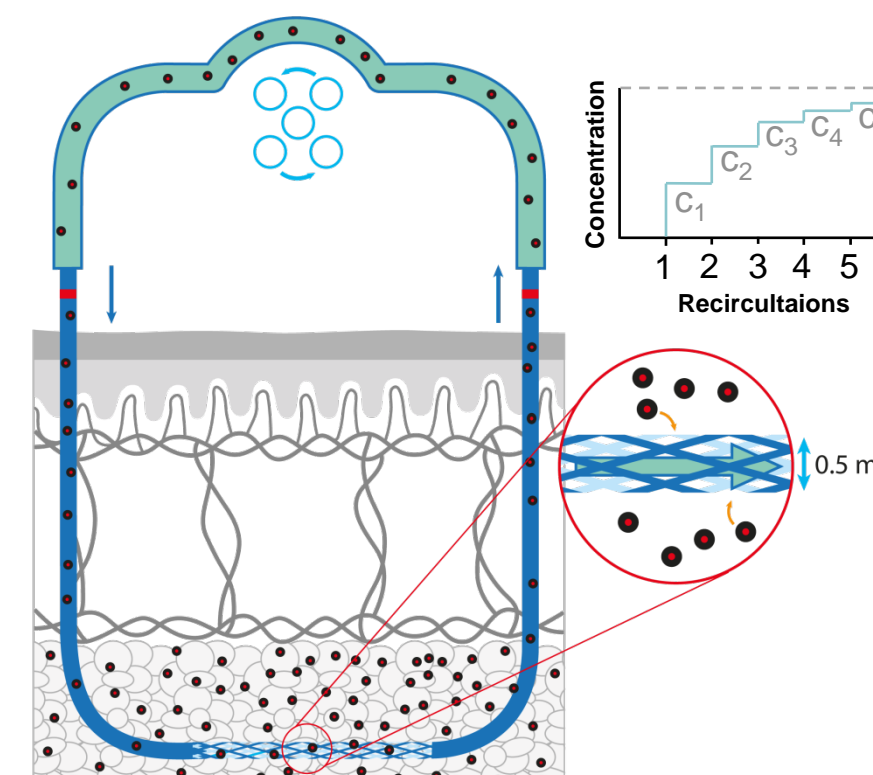
AIM

- To sample undiluted interstitial fluid (ISF) by open flow microperfusion (OFM)
- OFM has direct access to ISF and exchanges solutes between perfusate and ISF
- We will recirculate the perfusate for repeated exchange of solutes until equilibrium is achieved

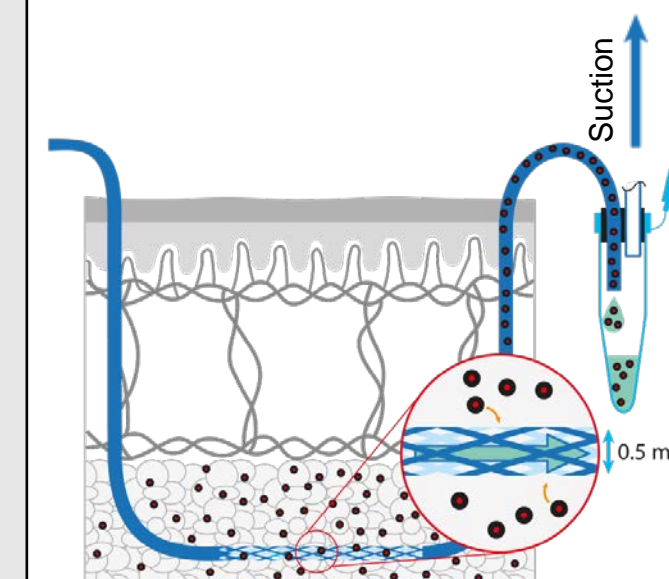
METHOD

- Anesthetized pigs (n=5)
- Sampling of the following body fluids
 - ISF by OFM recirculation
 - ISF by OFM suction
 - ISF alternative: lymph
 - Serum
- Analysis of albumin concentration in all fluids (BioTek Reader)
- Albumin as marker molecule to recognize degree of equilibrium between perfusate and ISF
- Comparison of albumin concentration between the different body fluids

Method 1: OFM recirculation

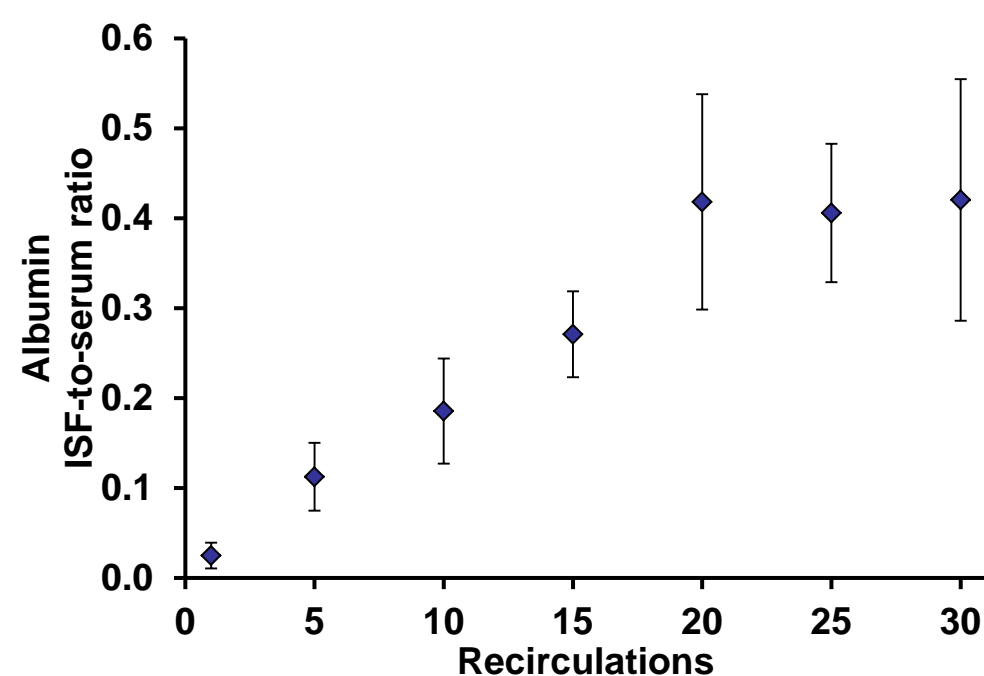


Method 2: OFM suction



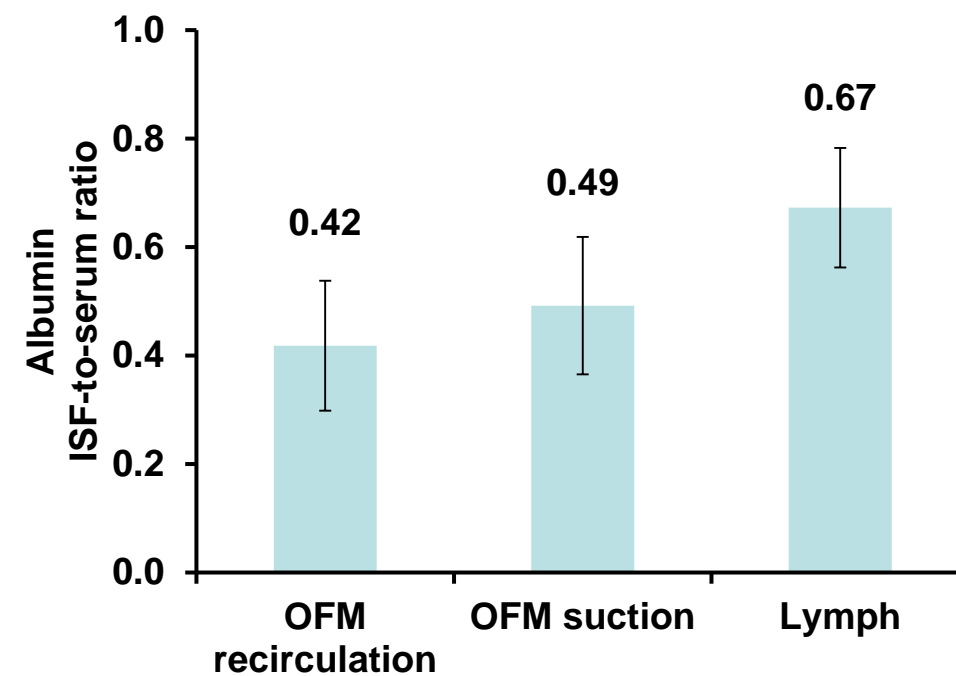
RESULTS

Albumin concentration in OFM recirculation



Increasing number of recirculations increased albumin concentration until saturation. Plateau indicates equilibrium of perfusate and ISF and thus sampling of undiluted ISF.

Albumin concentration in ISF samples



Albumin concentrations of OFM recirculation and OFM suction samples were similar while lymph contained significantly higher albumin concentrations.

CONCLUSION

- The new methods of **OFM recirculation** and **OFM suction** succeeded in sampling of undiluted ISF.
- Lymph may not be an appropriate ISF representative for protein binding analysis due to higher protein content than undiluted ISF.
- Protein binding analysis and absolute quantification in tissue fluids is now possible because the two new methods give access to undiluted ISF.

FUNDING / GRANTS / ENCORE / REFERENCE or other use

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