

Boosting buccal absorption: Bilosomes for effective therapeutic delivery

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Introduction

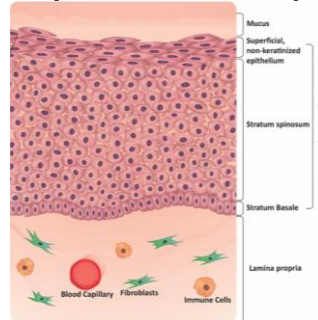
Why buccal delivery?

- Non-invasive
- Rapid onset of action
- Avoids first-pass metabolism



Barriers

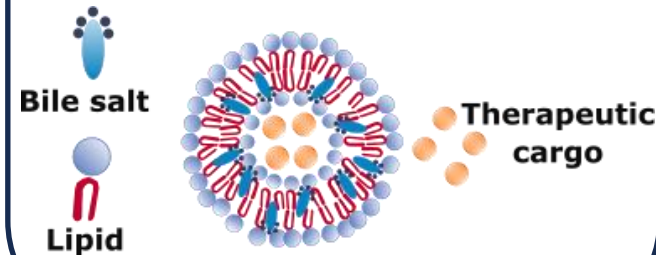
- × Poor retention
- × Enzymatic degradation
- × Low permeability



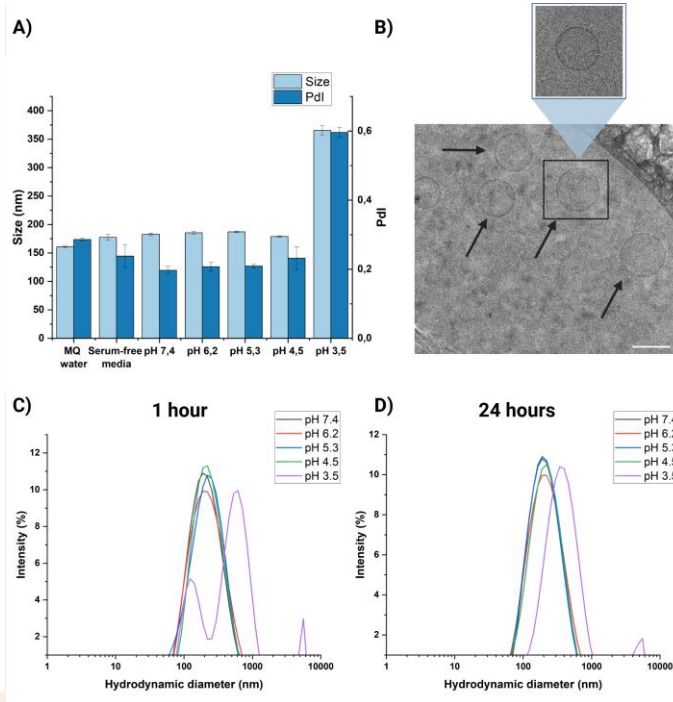
Sahil Malhotra, Thomas Lijnse, Eoin O' Cearbhaill, David J. Brayden, Devices to overcome the buccal mucosal barrier to administer therapeutic peptides, Advanced Drug Delivery Reviews, Volume 220, 2025

Bilosomes

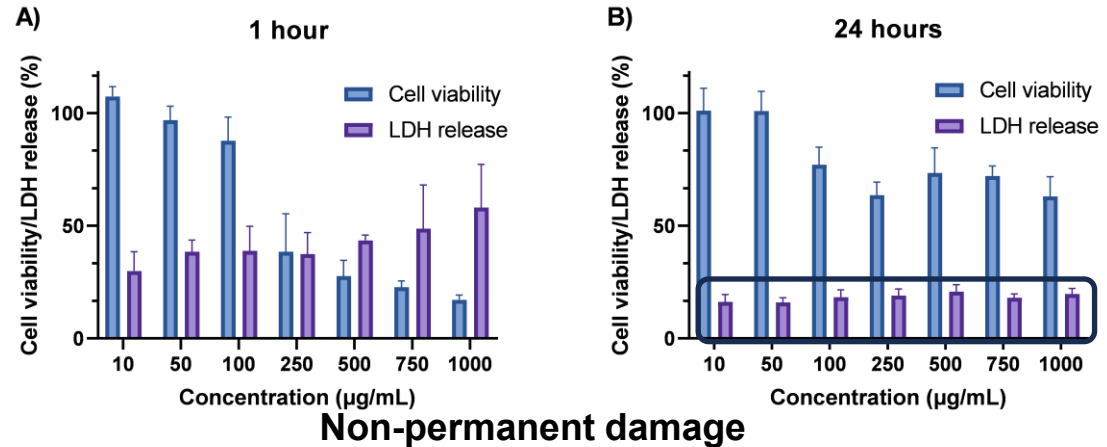
- Permeation enhancement
- Protects drug
- Enhances retention



Properties & Biocompatibility

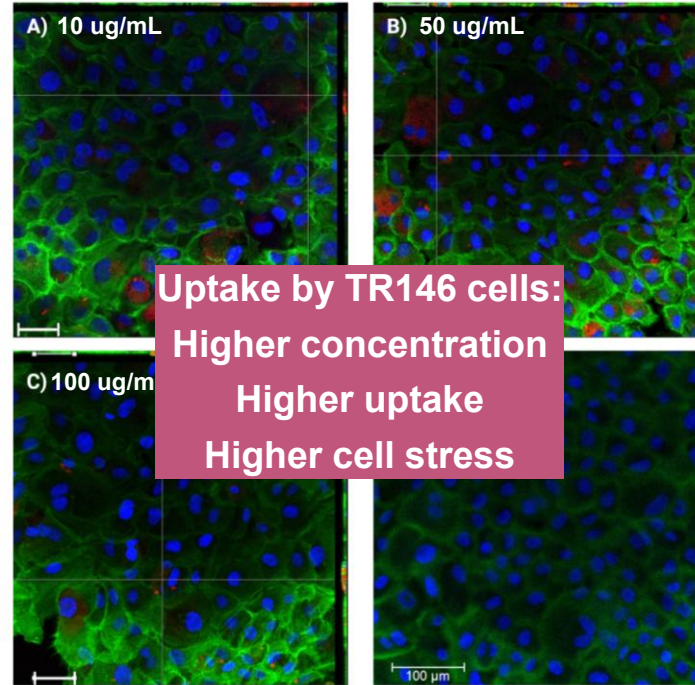
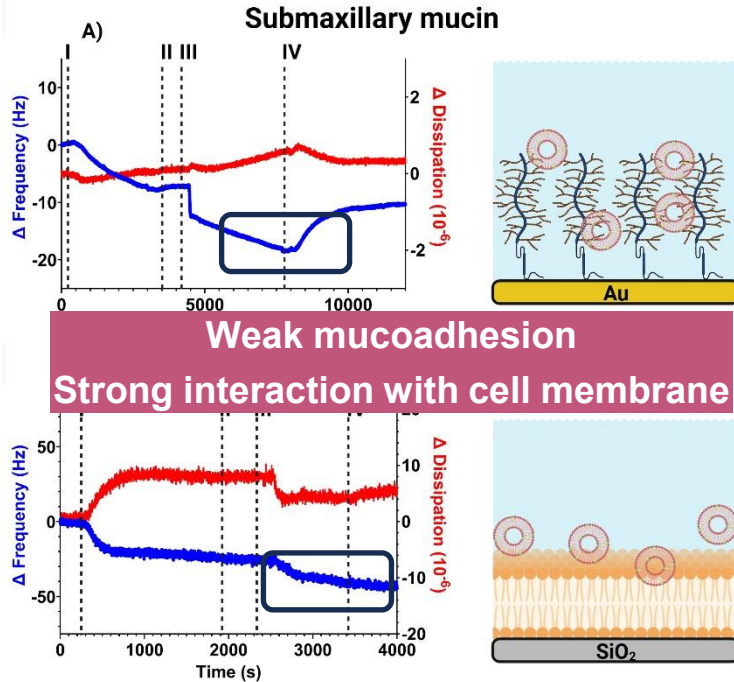


TR146 was derived from the neck node of a 67 year-old female (primary tumour was sited in buccal mucosa).



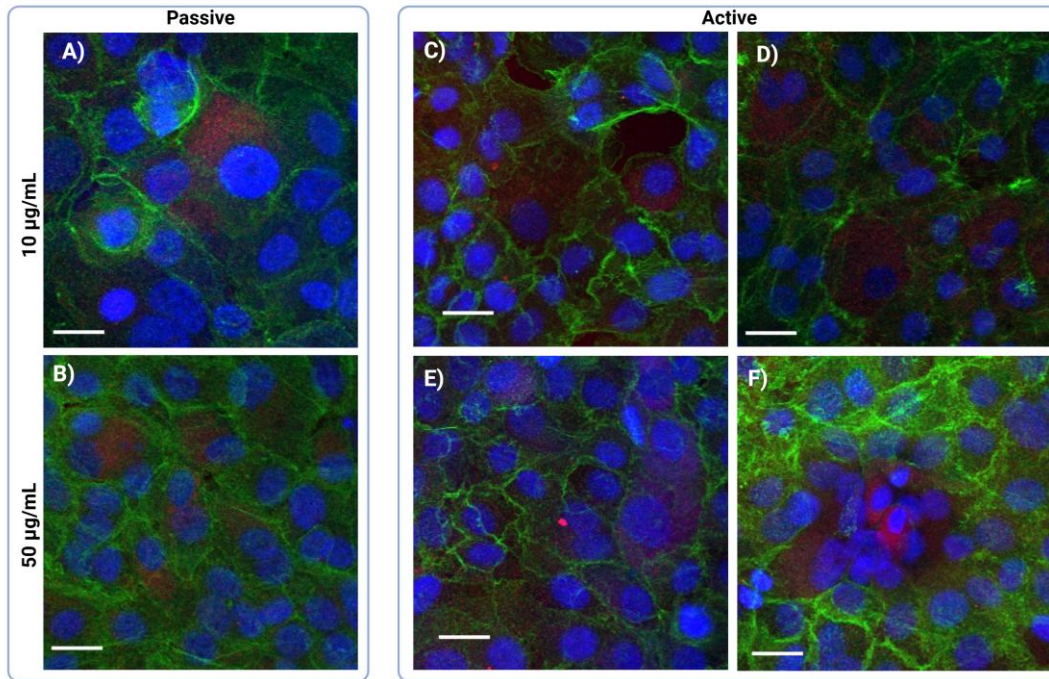
Interaction with bio-barriers

Phase I: formation of a physically adsorbed mucin/phosphatidylcholine layer
 Phase II: rinsing with ultrapure water
 Phase III: addition of bilosomes formulation
 Phase IV: rinsing with ultrapure water

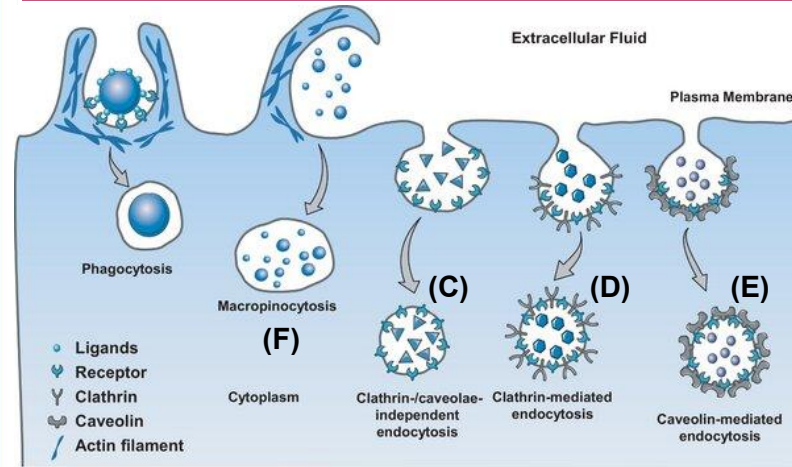


Scale bars represent 100 μm

TR146 uptake pathway



Bilosomes were uptaken in all scenarios. Passive uptake was hypothesized to be the uptake mechanism.



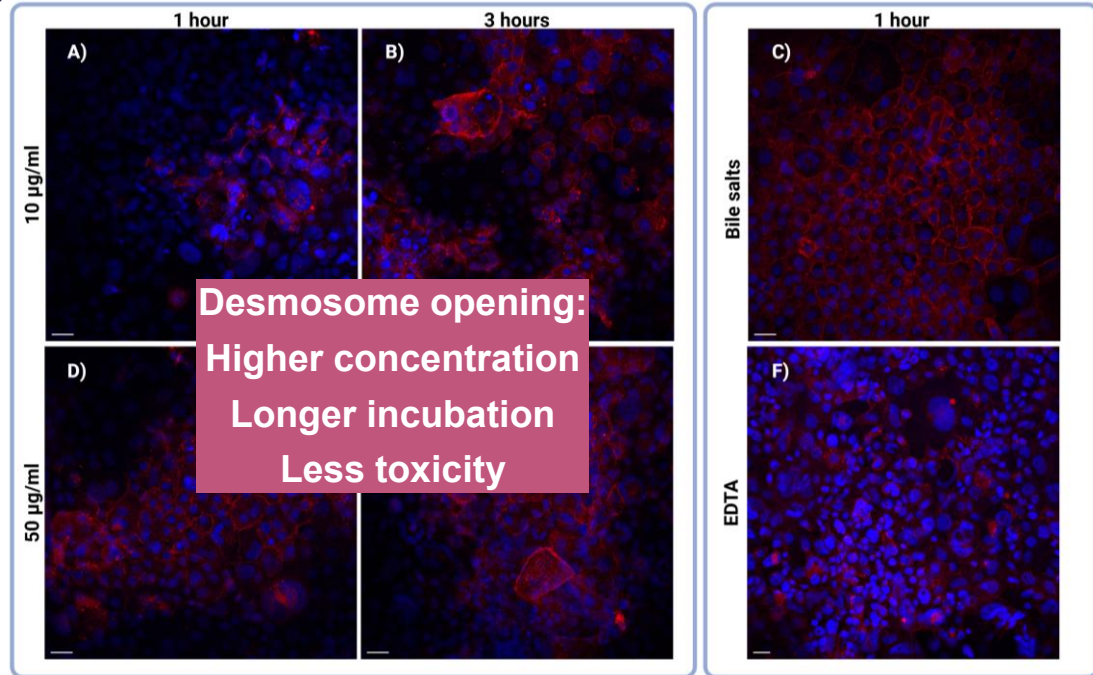
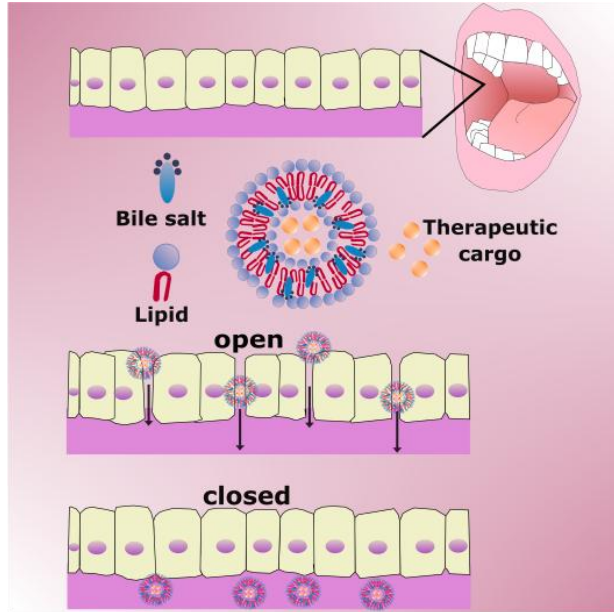
Zhou, Qiaoxia & Liu, Qiongliang & Wang, Yan & Chen, Jie & Schmid, Otmar & Rehberg, Markus & Yang, Lin. (2024). Bridging Smart Nanosystems with Clinically Relevant Models and Advanced Imaging for Precision Drug Delivery. *Advanced Science*. 11. 10.1002/adv.202308659.

Scale bars represent 100 µm

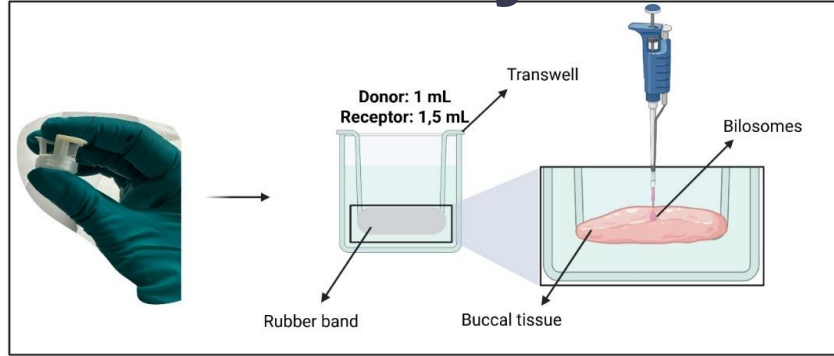
Permeability *in vitro*

Higher concentration
Higher permeability

Nuclei
Desmosomes opening

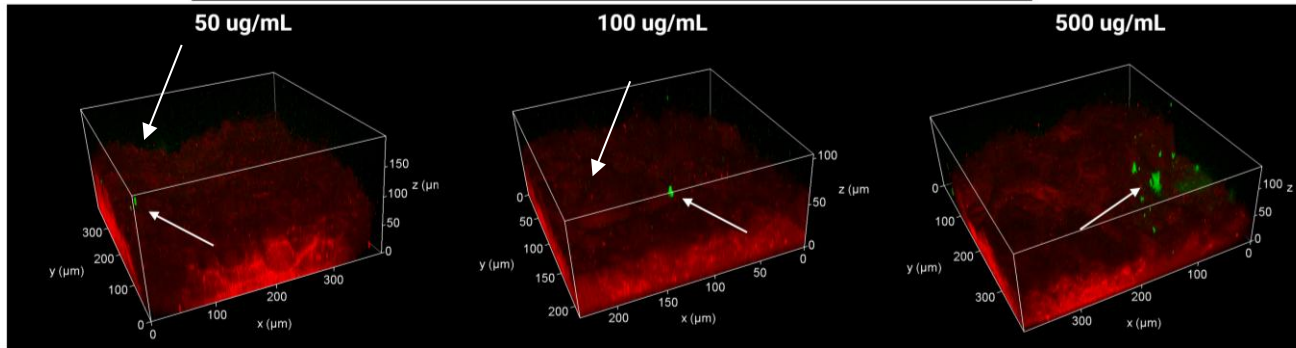
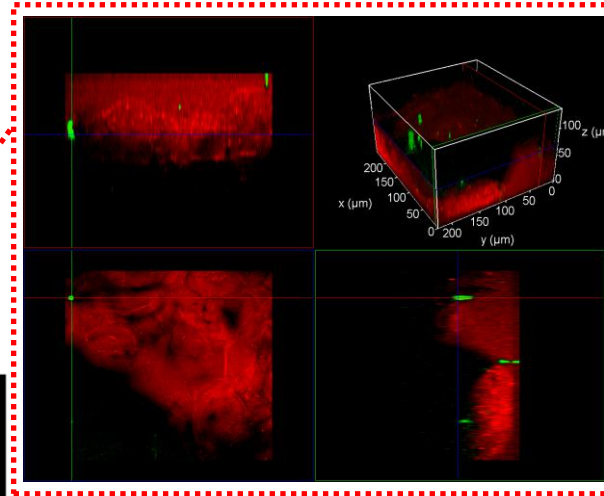


Permeability ex vivo



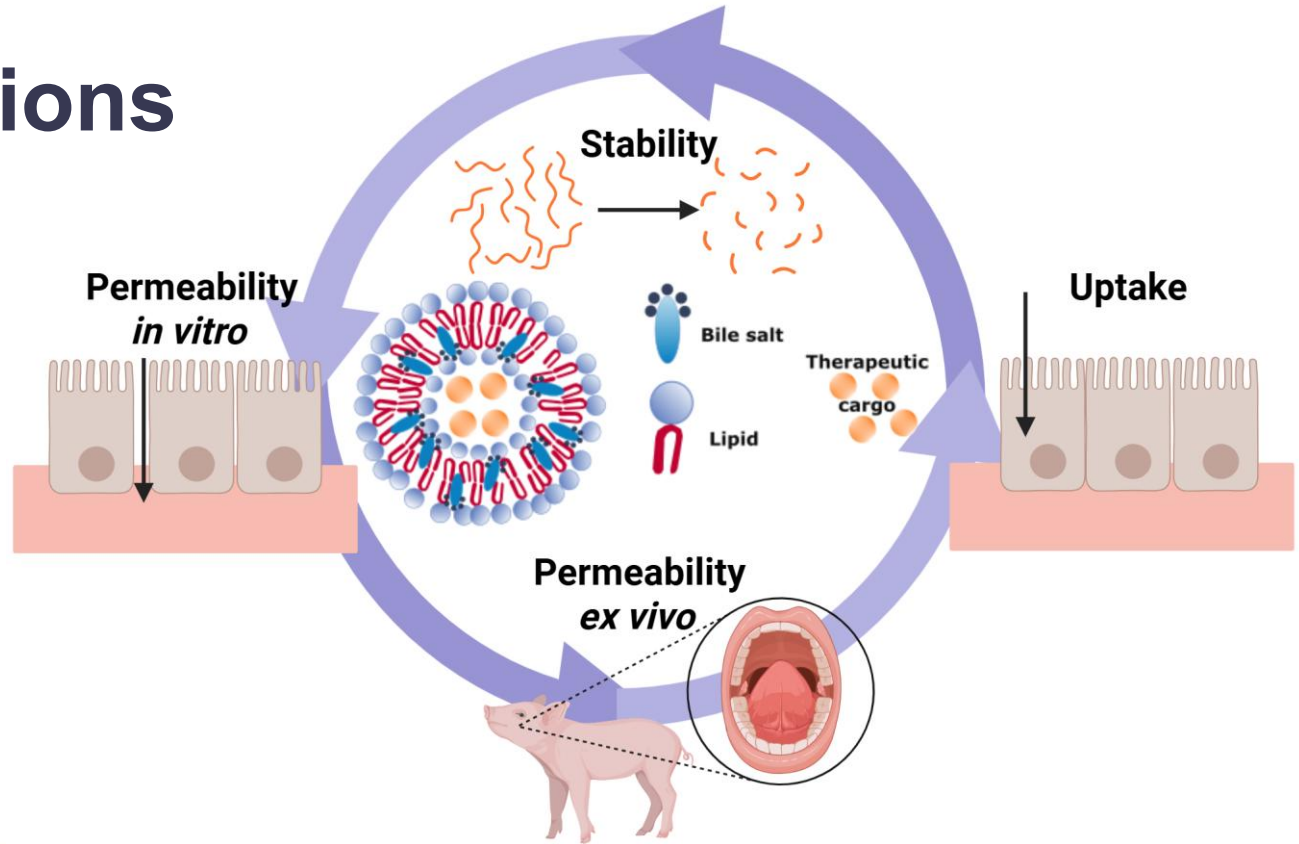
Higher concentration
Higher permeability

Lipids in the tissue
Biosomes ↑



Conclusions

- Uptake by TR146 cells
 - Cargo stability
- Enhanced permeability
 - Reduced toxicity



Acknowledgments



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**Let's connect on
LinkedIn!**

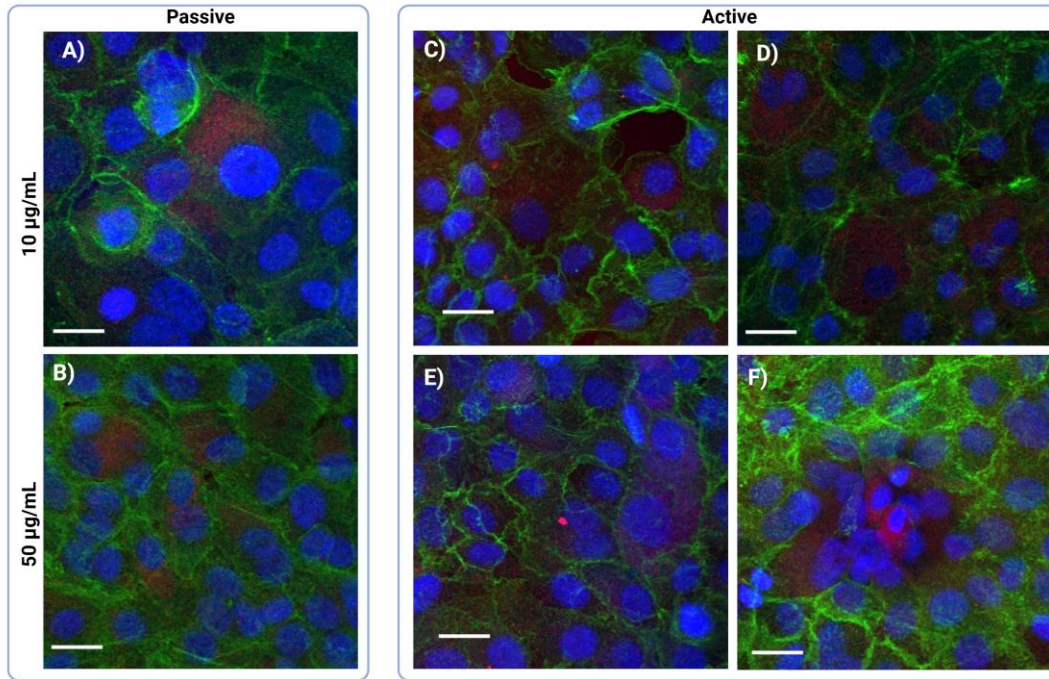


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TR146 uptake pathway



Inhibitor	Targeted pathway
A) Temperature	Passive
B) Temperature	Passive
C) Dynasore	Clathrin- and caveolae mediated endocytosis
D) Chlorpormazine	Clathrin-mediated endocytosis
E) Genistein	Caveolae-mediated endocytosis
F) EIPA	Macropinocytosis

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