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Angaben zur Veröffentlichung / Publication details:

Sirch, Manuel, Lara Clemen, Serap Demir, and Christoph Westerhausen. 2023. "The role of flow and membrane state for transport across endothelial cell membranes [Abstract]." *European Biophysics Journal* 52 (Supplement 1): S158.
<https://doi.org/10.1007/s00249-023-01668-7>.



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The role of flow and membrane state for transport across endothelial cell membranes

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In this research, we investigate the role of the endothelial glycocalyx in nanoparticle uptake and molecule transport into cells, as well as its impact on the phase state of the cells' plasma membrane in flow-based cell culture. Our results demonstrate that the presence or absence of the glycocalyx can significantly impact the uptake kinetics of nanoparticles and affect the molecular transport across the endothelial cell membrane. We further show that the glycocalyx can play a crucial role in maintaining the integrity of the cell membrane under flow conditions, which has important implications for the phase state of the cells during culture, in turn affecting the membrane phase state. These findings shed light on the interplay between the glycocalyx and the cell membrane in cellular function under physiological flow conditions and for the development of new therapeutics targeting the endothelium.