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Vascular and myocardial effects of SGLT2 inhibitors

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Biosketch

Following obtaining my master degree in Biology at the University of Wageningen, I pursued a PhD in skeletal muscle biomechanics at the Human Movement Sciences of the Vrije Universiteit at Amsterdam. This was followed by a post-doc at 1) the department of Physiology at the Vrije Universiteit Amsterdam, directed at mitochondrial function within stunned myocardium, and 2) the Bioengineering department of the University of Washington, Seattle, directed at cardiac models of oxygen transport. Then I started my own research group at the University of Amsterdam, department of Anesthesiology.

My laboratory's long term research goals are to: 1) elucidate mechanisms of cell death and vascular injury in the heart that contribute to the pathology of ischemia-reperfusion injury (IRI), heart failure, stress hyperglycemia and diabetes, and 2) develop clinical relevant strategies to combat cardiac cell death and vascular damage in the setting of acute IRI, stress hyperglycemia, heart failure, diabetes. Important contributions from our group to the field entail the elucidation of the role of 1) glycocalyx in vascular permeability in diabetes and hyperglycemia, 2) mitochondria-hexokinase binding in cardiac IRI, diabetes and ischemic preconditioning, 3) NLRP3 inflammasome in cardiac IRI,

4) innate immune receptor NLRX1 in mPTP regulation, and 5) direct cardiac effects of SGLT2 inhibitors.

Most relevant publications:

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2. Uthman L, Li X, .., Zuurbier CJ, Weber NC. Empagliflozin reduces oxidative stress through inhibition of the novel inflammation/NHE/[Na+]c/ROS-pathway in human endothelial cells. **Biomed Pharmacother**. 146:112515, 2022,
3. Uthman L, .., Zuurbier CJ. *Class effects of SGLT2 inhibitors in mouse cardiomyocytes and hearts: inhibition of Na+/H+ exchanger, lowering of cytosolic Na^+ and vasodilation*. **Diabetologia** 61:722-726, 2018,
4. Baartscheer A, Schumacher CA, Wüst RC, Fiolet JW, Stienen GJ, Coronel R, Zuurbier CJ. *Empagliflozin decreases myocardial cytoplasmic Na+ through inhibition of the cardiac Na+/H+ exchanger in rats and rabbits*. **Diabetologia**. 60:568-573, 2017.,
5. Zuurbier CJ, …Davidson SM. *Innate immunity as a target for acute cardioprotection.* **Cardiovasc Res**. 115:1131-1142, 2019,
6. Smeele KMA, …, Zuurbier CJ. *Disruption of hexokinase II-mitochondrial binding blocks ischemic preconditioning and causes rapid cardiac necrosis*. **Circ Res** 108:1165, 2011,
7. Zuurbier CJ, Demirci C, Koeman A, Vink H, Ince C. *Short-term hyperglycemia increases endothelial glycocalyx permeability and acutely decreases lineal density of capillaries with flowing red blood cells* J **Appl Physiol** 99:1471-6, 2005.