

Publication

Anaerobic Glycolysis Maintains the Glomerular Filtration Barrier Independent of Mitochondrial Metabolism and Dynamics

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 4501447**Author(s)** Brinkkoetter, Paul T.; Bork, Tillmann; Salou, Sarah; Liang, Wei; Mizi, Athanasia; Özel, Cem; Koehler, Sybille; Hagmann, H. Henning; Ising, Christina; Kuczkowski, Alexander; Schnyder, Svenia; Abed, Ahmed; Schermer, Bernhard; Benzing, Thomas; Kretz, Oliver; Puelles, Victor G.; Lagies, Simon; Schlimpert, Manuel; Kammerer, Bernd; Handschin, Christoph; Schell, Christoph; Huber, Tobias B.**Author(s) at UniBasel** [Handschin, Christoph](#) ;**Year** 2019**Title** Anaerobic Glycolysis Maintains the Glomerular Filtration Barrier Independent of Mitochondrial Metabolism and Dynamics**Journal** Cell Reports**Volume** 27**Number** 5**Pages / Article-Number** 1551-1566.e5

The cellular responses induced by mitochondrial dysfunction remain elusive. Intrigued by the lack of almost any glomerular phenotype in patients with profound renal ischemia, we comprehensively investigated the primary sources of energy of glomerular podocytes. Combining functional measurements of oxygen consumption rates, glomerular metabolite analysis, and determination of mitochondrial density of podocytes *in vivo*, we demonstrate that anaerobic glycolysis and fermentation of glucose to lactate represent the key energy source of podocytes. Under physiological conditions, we could detect neither a developmental nor late-onset pathological phenotype in podocytes with impaired mitochondrial biogenesis machinery, defective mitochondrial fusion-fission apparatus, or reduced mtDNA stability and transcription caused by podocyte-specific deletion of *Pgc-1 α* , *Drp1*, or *Tfam*, respectively. Anaerobic glycolysis represents the predominant metabolic pathway of podocytes. These findings offer a strategy to therapeutically interfere with the enhanced podocyte metabolism in various progressive kidney diseases, such as diabetic nephropathy or focal segmental glomerulosclerosis (FSGS).

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