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10th European Nephrology Conference

October 24-26, 2016   Rome, Italy

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Transcutaneous measurement of glomerular filtration rate in conscious laboratory animals: State of the art and future perspectives

Transcutaneous measurement of glomerular filtration rate ($_t$GFR) is now frequently used in preclinical in vivo animal studies. $_t$GFR allows consecutive measurements on the same animal, including multiple measurements on a daily basis. A description of the measurement device and its many applications, along with examples from the recent literature will be given. We will highlight the fields of interest in which the system is used and give an overview about its performance versus endogenous and other exogenous methods of GFR measurement. A special focus will be put on the precision of $_t$GFR compared to standard measurements employed in the research setting. A novel kinetic model for the description of transcutaneously measured excretion kinetics of the fluorescent GFR tracer FITC-Sinistrin was recently described. Using this new kinetic model designated $_t$GFR$_{3cp.b.m}$), $_t$GFR measurements in the rat model reached comparable precision as GFR measurements assessed using a gold standard technique based on constant infusion (cGFR). The precision of $_t$GFR assessment when using $_t$GFR$_{3cp.b.m}$, coupled with the capability of consecutive GFR measurements in the same animal over a long time span should enhance the quality of, and reduce the cost of, preclinical assessment of renal function in pharmaceutical research.

Biography

Daniel Schock Kusch finished his Doctoral thesis dealing with the development of novel markers for GFR measurement and their transcutaneous measurement at University of Heidelberg in 2008. He further participated in the development of that technique as Research Scientist at Innovation Lab GmbH, Heidelberg and Post-doc at University of Heidelberg and University of Applied Sciences Mannheim. In 2011, he became Co-founder of Mannheim Pharma & Diagnostics GmbH bringing the first system for transcutaneous measurement of kidney function for preclinical research to market. He is now Site Director at Medibeacon GmbH.

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J Nephrol Ther
ISSN: 2161-0959 JNT, an open access journal

Nephrology Conference 2016
October 24-26, 2016

Volume 6, Issue 6 (Suppl)

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