Is a Perfused Boundary Region right parameter for endothelial glycocalyx description?

David Astapenko¹, Vladimir Cerny²
¹University Hospital Hradec Kralove, Czech Republic
²University Hospital Usti nad Labem, Czech Republic

In vivo visualization of the endothelial glycocalyx (EG) is very difficult, mainly due to its fragility. The state of the EG can be indirectly investigated by measuring plasma levels of its constituents or directly by using a light reflectance microscope in a hand-held device. This principle has long been used for semiautomatic assessment of microcirculation. Newly designed software (SW) and next generation of side-stream dark field imaging camera is capable of fully automatic assessment of EG thickness. This SW automatically counts among others parameters the erythrocyte exclusion zone lining the endoluminal side of the endothelial cells called as Perfused Boundary Region (PBR). PBR describes the amount of the lateral deviation of the medial red blood cells (RBC) column. With damaged EG the RBC penetrate deeper into EG, closer to endothelial cells surface, thus the PBR increases. The cut off value recognised as being associated with significant EG damage is 2,5 μm.

As this SW is automatic it omits inter-individual variability in evaluation and it is able to provide us swiftly dozens of results. But can we fully trust this method and should an automatic process be always required in research?

Our experiences with this method are ambiguous both at the field of experimental and clinical research.

Evaluating PBR seems to be promising parameter of the indirect EG assessment. More studies are needed though to widely adopt this method as unambiguous and reliable.