Abstract No 58

IN VITRO AND *IN VIVO* COMPARISON OF LASER DOPPLER PERFUSION MONITORS

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Our efforts to standardise the laser Doppler perfusion monitoring technique may lead to a standard "European perfusion unit" that is independent of the specific instrument used, and that can be applied under well defined conditions.

Flux readings are compared of various commercial laser Doppler blood flow monitors. A possible one-to-one relationship between instruments may lead to a "European perfusion unit". Comparisons are carried out both *in vitro* and *in vivo*.

For the *in vitro* case a flow model has been developed in which motion of solid scattering layers is realized inside a static tissue phantom. Initial measurements indicate that for a wide range of layer velocities and scattering levels of the phantom, a one-to-one relation exists between various fibreoptic laser Doppler flow monitors, provided that the concentration of moving particles is restricted. For higher concentrations the investigated instruments behave nonlinearly, and fundamentally different from each other.

In vivo measurements are performed on the piglet's renal cortex using LDF probes with fibre spacings of 250 and 500 micrometer. For both probes, manipulations such as lateral shifts of approx. 1 mm and probe rotations resulted in LDF flux variations with a standard deviation of approximately 15% of the mean value for the mentioned probes, respectively. This gives an impression of the small scale inhomogeneities of the renal cortex microcirculation. A large fraction (80-100%) of the light is Doppler shifted, partly due to movement artefacts caused by the ventilation of the piglet and partly due to the