Abstract Submitted for the MAR05 Meeting of The American Physical Society

A new parameter identification method to obtain change in smooth musclecontraction state due to mechanical skin irritation DANIELA BAUER, REINHARD GREBE, ALAIN EHRLACHER, Ecole Nationale des Ponts et Chaussees — A light scratch with a needle induces histamine and neuropetide release on the line of stroke and in the surrounding tissue. Histamine and neuropeptides are vasodilaters. They create vasodilation by changing the contraction state of the vascular smooth muscles and hence vessel compliance. Smooth muscle contraction state is very difficult to measure. We propose an identification procedure that determines change in compliance. The procedure is based on numerical and experimental results. Blood flow is measured by Laser Doppler Velocimetry. Numerical data is obtained by a continuous model of hierarchically arranged porous media of the vascular network [1]. We show that compliance increases after the stroke in the entire tissue. Then, compliance decreases in the surrounding tissue, while it keeps increasing on the line of stroke. Hence, blood is transported from the surrounding tissue to the line of stroke. Thus, higher blood volume on the line of stroke is obtained. [1] Bauer, D., Grebe, R. Ehrlacher, A., 2004. A three layer continuous model of porous media to describe the first phase of skin irritation. J. Theoret. Bio. in press

> Daniela Bauer Ecole Nationale des Ponts et Chausses

Date submitted: 29 Nov 2004 Electronic form version 1.4