

## POSSIBILITY OF NONDESTRUCTIVE ANALYSIS OF CHOLESTEROL AND COLLAGEN IN ATHEROSCLEROTIC PLAQUES USING NIRS

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The aim of this study was to examine whether near infrared spectroscopy (NIRS) is an acceptable tool to determine cholesterol and collagen in human atherosclerotic plaque without destruction of the analyzed areas and without danger the endothelial cells – three preconditions for the development of a NIR-heart-catheter. The questions were: Can the cholesterol and collagen content of the arterial intima be estimated with acceptable precision in vitro by NIRS despite the matrix inhomogeneity of the plaques and their anatomic variability? How deep can such NIR radiation penetrate into arterial tissue without danger for endothelial cells? Is this penetration sufficient for information on the lipid and collagen accumulation? Using NIRS, cholesterol and collagen can be determined with acceptable precision in model mixtures and human aortic specimens ( $r=0,896$  to  $0,957$ ). The chemical reference method was HPLC. The energy dose was  $71 \text{ mW/cm}^2$  using a fiber optic strand with a length of 1.5m and an optical window of  $d=4\text{mm}$ . This dose appears to be not dangerous for endothelial cells. It will be attenuated to 50% by a arterial tissue of about  $170\text{-}200\mu\text{m}$  thickness. The results are also acceptable using a thin coronary catheter-like fiber optic strand ( $d=1\text{mm}$ ).