IN-VIVO NON-INVASIVE MEASUREMENT OF SKIN BIOMARKERS IN A MOUSE MODEL OF CARDIOVASCULAR DISEASE

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Background

The formation of reactive oxygen species (ROS) is associated with cardiovascular disease (CVD). High cholesterol can significantly alter mitochondrial metabolism leading to ROS formation in the vasculature. We aimed to establish a methodology for non-invasive assessment of skin autofluorescent biomarkers in mice.

Methodology

C57/B/6 wild-type (Wt) (n= 25) male mice were subdivided to receive normal rodent chow (n=11) or a high cholesterol diet (2% cholesterol) (n=14) for 20 weeks. Skin auto-florescence measurements were made on the backs of anaesthetised (1.5-2% isoflurane in oxygen) mice. A laser probe (LAKK-M) (LAZMA) was used to make simultaneous measurements of: collagen, elastin, NADH, pyridoxine, flavins, lipofuscin and carotene. Results are expressed as group mean in arbitrary units (AU)±standard error (SE). Hearts were excised and weighed (mg), cardiac hypertrophy was confirmed by body weight (g)/heart weight (mg)±SE. Students T-test was used for statistical significance analysis ($p \leq 0.05$).

Results

There were no significant differences between cholesterol and chow fed animals for collagen (34AU±4 VS. chow 38AU±5, p=0.258) and elastin (66AU±6 VS. chow 82AU±7, p=0.057). Significant differences were evident for NADH (92AU±7 VS. chow 118AU±7, p=0.008), pyridoxine (56AU±4 VS. chow 73AU±4, p=0.006), flavins (44AU±3 VS. chow 57AU±4, p=0.009), lipofuscin (35AU±3 VS. chow 46AU±3, p=0.008) and carotene (19AU±2 VS. chow 25AU±2, p=0.008). Cholesterol fed animals had significantly heavier hearts (202±5 VS. chow 176±6) (p=0.0007).

Discussion and Conclusions

Cholesterol feeding induced CVD as noted by cardiac hypertrophy in Wt mice. A reduction in pyridoxine, flavins, lipofuscin and carotene were noted and are established risk factors for CVD.