Medical Xpress

Mice fed a high-fat diet show signs of artery damage after only 6 weeks

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High fat diets cause damage to blood vessels earlier than previously thought, and these structural and mechanical changes may be the first step in the development of high blood pressure. These findings in mice, by Marie Billaud and colleagues from the University of Virginia School of Medicine in the US, are published online in Springer's *Journal of Cardiovascular Translational Research*.

With age, increasing weight and metabolic disease, the internal walls of our large arteries progressively thicken and become less elastic, which can lead to furring up of the arteries (atherosclerosis) and increased resistance and high blood pressure in severe cases. At present, researchers and physicians tend to measure arterial compliance (a measure of arterial stiffness) in large arteries in relatively advanced stages of metabolic diseases.

However, this may not provide the full picture of when a disease starts and how it develops. In addition, previous work has suggested that structural alterations in the walls of small arteries are the most potent predictor of cardiovascular diseases, suggesting that early identification of these changes is important.

Billaud and team compared the arterial compliance of two different sized arteries: carotid (large) and thoracodorsal (smaller) in two groups of mice: one fed a high-fat diet for six weeks; the other a control group on a traditional diet.

They found that the structural and mechanical properties of small arteries were rapidly altered, even after only six weeks of high fat feeding. Specifically, the compliance of the smaller arteries was dramatically reduced in the mice on the high-fat diet, whereas there was no change in stiffness in the larger arteries. The researchers also found a build-up of collagen in the walls of the smaller arteries.

The authors conclude: "These results suggest that, at an early stage of obesity, the structural properties of small and large arteries are altered whereas arterial stiffness is only observed in small vessels. This implies that small vessels are targeted earlier compared to large arteries, and this could therefore play a role in the development of hypertension associated with a long-term caloric-enriched diet."

More information: Billaud M et al (2012). Loss of compliance in small arteries, but not in conduit arteries, after 6 weeks exposure to high fat diet. *Journal of Cardiovascular Translational Research*; DOI 10.1007/s12265-012-9354-y

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