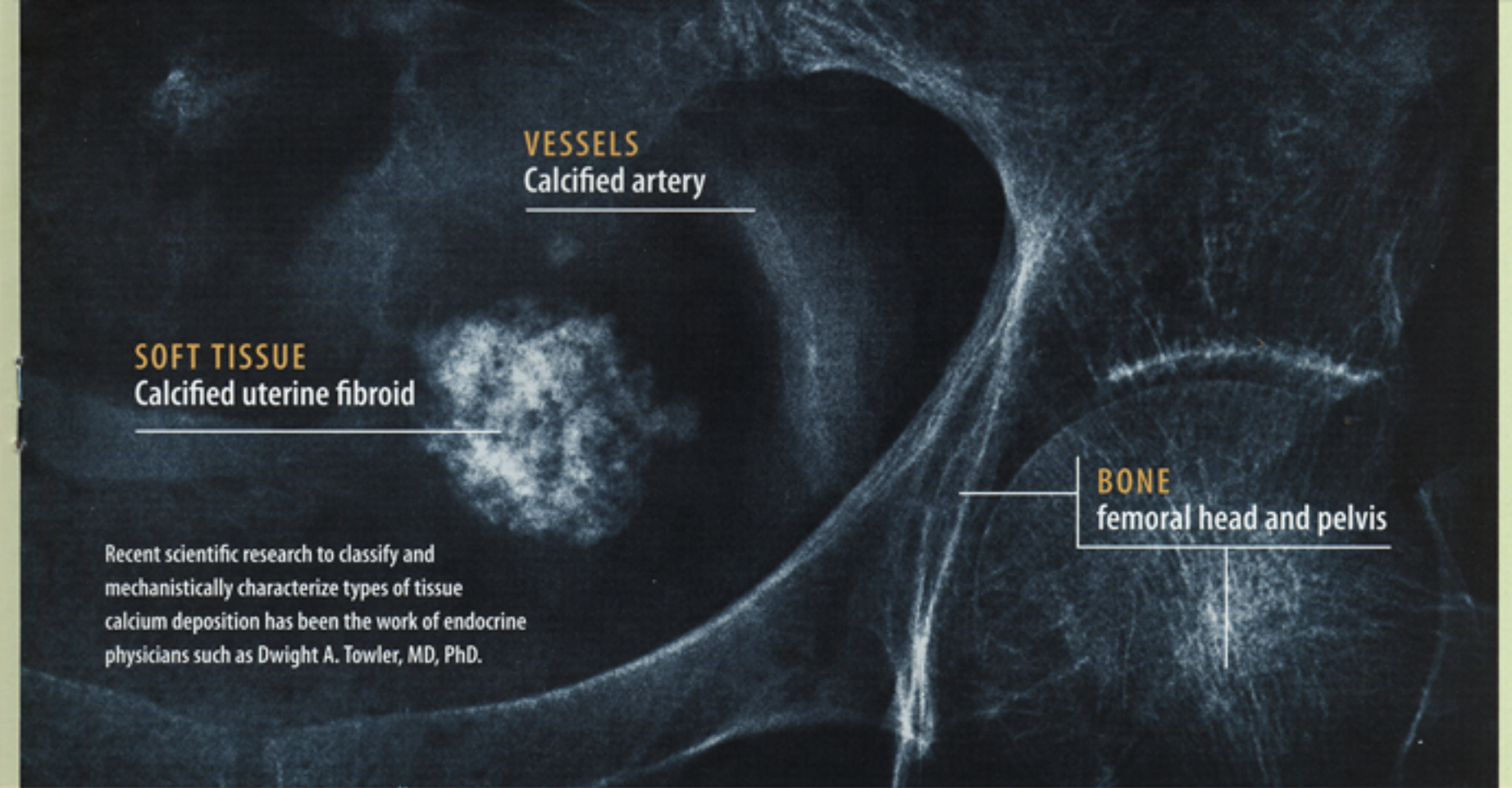


Unsafe deposits

Calcium can build up in the wrong places within the body

Calcium, an essential building block of the human body's skeleton, travels throughout the bloodstream. It can, however, deposit in blood vessels, mineralizing to form bone-like tissue, thwarting the smooth flow of blood to organs. Understanding how and why this happens to people with diseases such as diabetes, kidney failure and high cholesterol may lead researchers to find ways to keep calcium stored only where it is needed.

BY ERIC YOUNG RESEARCH IMAGES AND DATA: TOWLER LAB



Lost flexibility of vessels strains the heart: medial artery calcification

Calcium deposits encircle and stiffen an otherwise naturally elastic artery. The heart must work harder to circulate blood with no kinetic assist from the rubbery rebound action of a healthy vessel. This condition is a corollary of diabetes and end-stage renal disease.

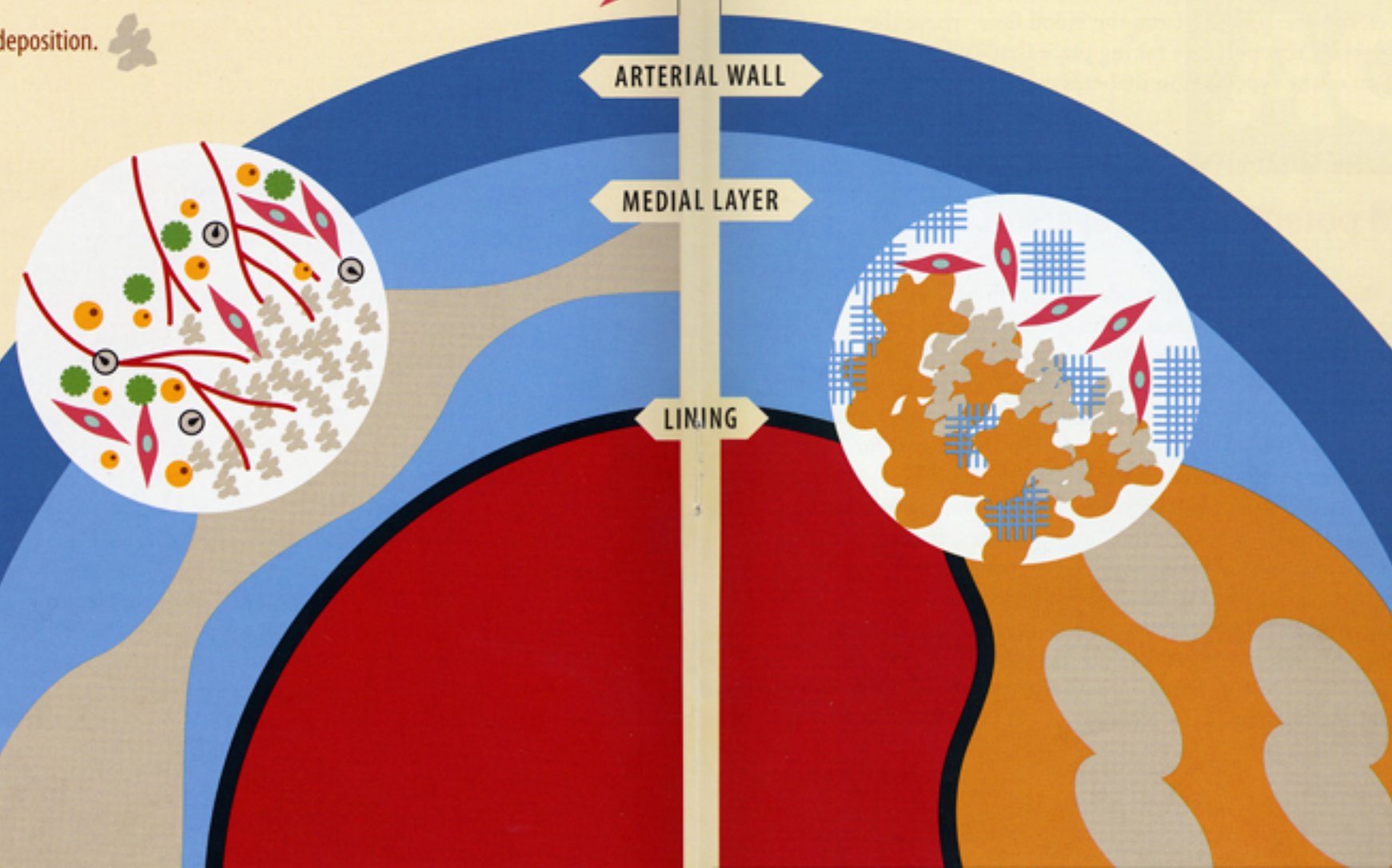
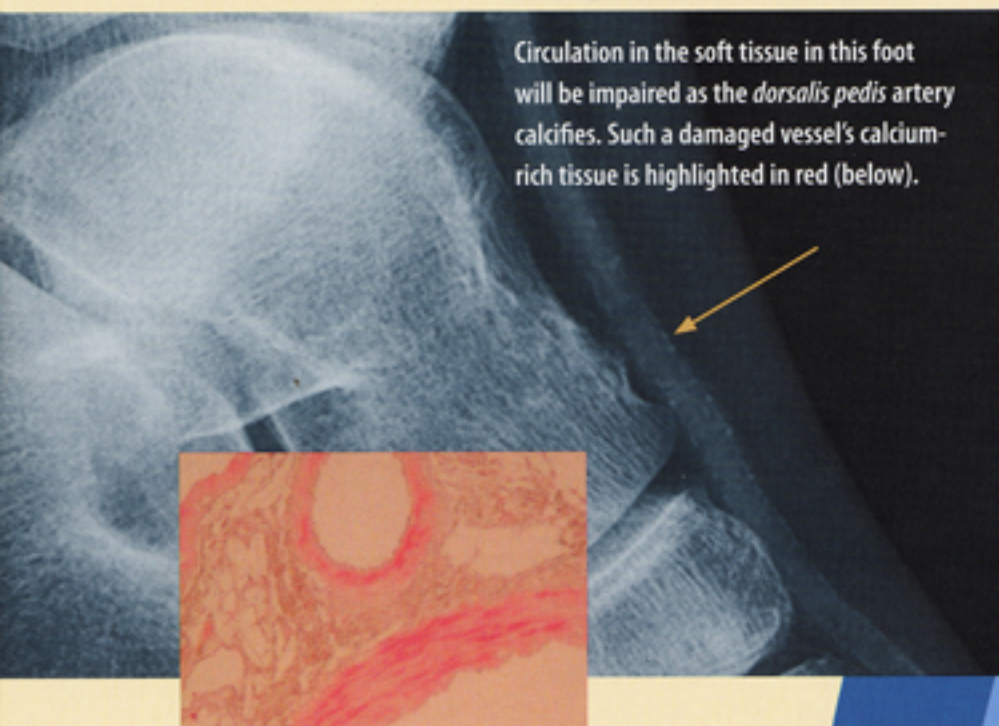
In addition to nutrients, capillaries can pipe trouble within the walls of the artery, including blood fats that create adipocyte cells and recruit tissue macrophages. Together, these secrete inflammatory signaling hormones, which ultimately generate vascular bone-forming cells — derived from certain smooth muscle cells — that direct calcium deposition.

Vessel blockage creates a coronary time bomb: atherosclerotic (fibrous) calcification

Deposits of lipid, protein, smooth muscle cells and calcium deform the vessel on one or more sides. These buildups are characteristic of high cholesterol. In addition to stiffening the vessels, this process creates an abnormal surface that can trigger arterial blood clots.

High cholesterol in the blood builds up beneath the inner lining of the artery. Inflammation, cell death and fibrosis initiate calcification. This vascular "scar tissue" induces the formation of bone and cartilage cells — derived from certain smooth muscle cells — that direct further calcium deposition.

MEDIAL ARTERY CALCIFICATION



ATHEROSCLEROTIC CALCIFICATION

Calcium collects in the lining of the aorta deep within the body. This not only stiffens vessels but predisposes them to arterial blood clots.

Atherosclerotic calcification is widely known but unfortunately not always clearly distinguished from medial artery calcification.

