

muscle physiology lecture 19

things that can induce vascular permeability - vascular endothelial growth factor, prostaglandins, complement proteins, histamine, bradykinin, thrombin, platelet activating factor, serotonin, nitric oxide, reactive oxygen species, tumor necrosis factor, and vasodilation itself. leaky vessel - wall becomes porous - fluids escape.

plasma contains three main molecular constituents: albumin, globulins, fibrinogen.

mast cells can degranulate (release granules of histamine) in response to physical injury or substance P or complement proteins or macrophage factors, which are released by macrophages. histamine causes further vasodilation & leaks. extracellular ligands binding to their receptors on the cell surface can cause the mast cells to degranulate.

functional hyperemia / reactive hyperemia

reactive hyperemia - increase in blood flow above resting levels that occurs after a period of blood flow stoppage, usually induced by arterial occlusion.

nicotinamide adenine dinucleotide (NAD) reduced to NADH which is an electron donating compound. NADH excess indicates more reliance on anaerobic metabolism.

vasodilation in the contracting muscles for outstrips changes in blood pressure as the major determinant of exercise hyperemia in humans and most species under most circumstances. metabolism drives blood flow. this is because when tissues increase their metabolic demand, they need more blood flow to satisfy their need for substrate delivery and metabolite removal. this is known as active or functional hyperemia. when a muscle fiber contracts, it is metabolic activity. a second after exercise, there is an increase in blood flow in that fiber's direction. substrates and products of that metabolism diffuse into the blood, providing information about the internal metabolism of that cell. that informs the circulatory system to provide more blood.