



## GLOSSARY - GARY D. LOPASCHUK

### PCI (percutaneous coronary intervention)

PCI is a non-surgical, revascularization procedure utilized in the setting of atherosclerotic coronary artery disease. PCI utilizes a catheter to place a stent into a stenotic coronary artery, to subsequently reduce coronary narrowing, and thus improve blood flow to regions of the myocardium distal to the atherosclerotic lesion.

### Microcirculation

The microcirculation is comprised of several components of the vascular system, including arterioles, capillaries, and venules. The contractile state of arterioles is the major determinant of peripheral vascular resistance, whereas, the contractile state of venules influences venous return to the heart. The exchange of nutrients, gases, chemical mediators, and metabolic by-products between cells and the blood occurs via capillaries.

### Adenosine

Adenosine is an endogenous purine nucleoside, formed from the breakdown of intracellular ATP in response to cellular stresses including hypoxia, and ischemia. Adenosine can gain access to the extracellular/interstitial space via nucleoside transporters located in the plasma membrane, and subsequently activate a variety of cell surface, G-protein coupled receptors (e.g.  $A_1$ -,  $A_{2a}$ -,  $A_{2b}$ -, and  $A_3$ -adenosine receptors) to exert its biological effects.

### Resistance

In the vascular system, resistance describes the mechanical factors that must be surmounted to propel blood through the circulatory system. Resistance is primarily determined by the contractile state/diameter of the arterioles.

### Hyperemia

Hyperemia refers to an increase in blood flow to a region of the body. Active hyperemia occurs in response to an increase in metabolic/energetic demand; whereas, reactive hyperemia occurs transiently, following brief ischemia.

### Fractional Flow Reserve (FFR)

FFR is an invasive measurement, defined as the ratio of maximum blood flow in a stenotic epicardial

coronary artery, relative to maximum theoretical blood flow in the same artery in the absence of a stenotic lesion. The ratio of the two flows is expressed as the ratio of two driving pressures for coronary flow,  $P_d$  and  $P_a$ .  $P_d$  represents pressure across the stenotic lesion, whereas,  $P_a$  represents aortic pressure, both measured at maximum coronary flow. FFR identifies hemodynamically significant coronary stenosis that predisposes to inducible ischemia. FFR functions as a decision making tool for revascularization.

### Cardiac Magnetic Resonance (CMR)

CMR exploits the magnetic properties of various atomic nuclei. Cardiac magnetic resonance imaging (CMRI) is a non-invasive imaging modality considered to be the "gold-standard" for quantifying ventricular mass, structure, volume, and function.

### Oxidative Stress

Oxidative stress in general is the deterioration in normal redox state primarily due to an imbalance between pro-oxidants and anti-oxidants sufficient to induce modification/damage of macromolecules. This results in the production of peroxides and free radicals that are often toxic to cells via damaging DNA, lipids, and proteins.

### Nitric Oxide

Nitric oxide is a gaseous signaling molecule produced in the human body via the enzymatic activity of nitric oxide synthase. It has a number of important biological functions, one of its primary ones to act as a powerful vasodilator that induces smooth muscle cell relaxation. Pharmaceutical agents such as nitroglycerin, which are used for the treatment of angina, mediate their anti-ischemic effects by acting as precursors for nitric oxide biosynthesis.

### Vitamin D

Vitamin D is a fat-soluble secosteroid responsible for intestinal absorption of calcium and phosphate. Vitamin D is not an essential dietary vitamin, as the majority of mammals can synthesize vitamin D endogenously in adequate amounts following sufficient exposure to sunlight. Although vitamin D supplementation has been thought of as having beneficial effects on cardiovascular health, the results of recent studies have proven to be inconclusive and this remains an active area of ongoing research.

