3. Milestones and frontiers in vascular physiology in health and cancer

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Cardiovascular diseases are the main cause of death in the world: ischemic heart disease (IHD) and stroke account for 30% of total deaths, remaining as leading causes of death globally in the last 15 years. Diabetes and cancer are the fifth and sixth causes of death; those four diseases totaled more than 18 million of deaths in 2015. Cancer depends on vessels too, needing angiogenesis to grow and metastasis. From another point of view, vascular diseases manifest interestingly during pregnancy, where arterial pressure and/or body composition abnormalities manifest with different intensity among patients: hypertension (called preeclampsia, PE), excessive gestational weight gain (EGWG) and gestational diabetes mellitus (GDM). All the listed abnormalities share common pathophysiological pathways with a low grade inflammatory basis which generates oxidative stress, being the vessel wall the final common pathway for the impact of cardiovascular risk factors and genetic predisposition to metabolic, hypertensive and ischemic diseases, inducing the endothelial dysfunction which underlies most of the clinical and paraclinical findings. Vessel wall is an organ with huge paracrine, endocrine and autocrine activity, then its affectation could be not only a consequence but the cause in those pathologies. It is mandatory to research in vascular wall physiology and pathophysiology to understand such disorders and, optimally, to prevent them and their related, as well as to design more precise therapies and consequently to diminish the associated morbidity, mortality and costs. Milestones in vascular physiology will be presented from William Harvey until our days, and frontiers in research emphasizing in health and cancer of mesenteric and placental beds, and the looking for evidences of a muscle-adipocyte-endothelium axis. Those are the challenges for The Vascular Physiology section of the PHYSIS lab at the University of Antioquia. As a conclusion, our lines and preliminary results of research in vascular reactivity, cancer, angiogenesis, PE, EGWG and GDM, and the scientific nets we are working on, will be shown and discussed.

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