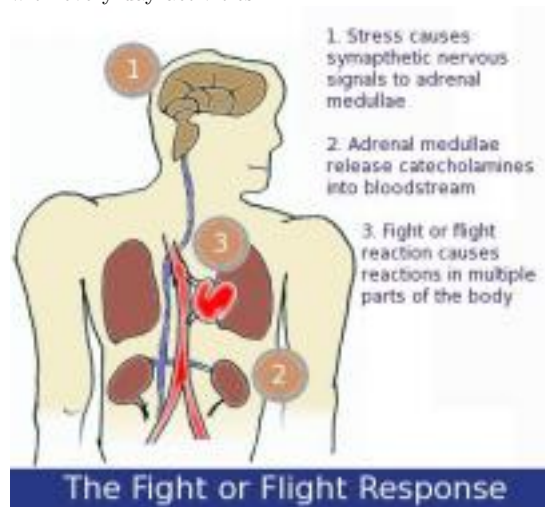


Stress Mechanism in Coronary Heart Disease

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Fig. 1. The Fight or Flight response is integral in dealing with every day activities



Although the direct role of stress in disease is still not known, a number of important factors have linked stress to the emergence of various diseases.

The stress response known as the fight or flight mechanism is integral in helping an individual to deal with everyday activities. When a person faces a stressor which is the internal or external demands on the body, the A1/A2 noradrenergic neurons in the medulla oblongata of the brain is activated (Pezzone et al 1993). These two neurons act as intermediates for stress signals in the central nervous system (Gaillet S 1993). Noradrenaline (NA) and PRL-releasing peptide (PrRP) that are produced by these neurons (Morales et al 2000) will stimulate the release of ACTH from the anterior pituitary through the CRH hypothalamic neurons (Maruyama et al., 2001). ACTH will control the release of corticosteroids from the medulla adrenal through endocrinal action (Owens & Nemeroff, 1991). The ACTH and CRH hormones are linked to the first stage of HPA-axis activation while cortisol is the final product.

When the response is repeatedly activated, the usual homeostatic equilibrium is disturbed and a cumulative effect ensures that ultimately leads to various stress related disorders (Marmot & Brunner, 2001). This is directly linked to the various physiological reactions that resulted from the stress response, namely an increase in the sympathetic nervous system, increase in the body's metabolism, increase in heart rate, increase in blood pressure and an increase in the breathing rate. The fight or flight response is adaptive to acute stress but maladaptive to chronic stress (Salposky & Mott, 1987).

Although, coronary heart disease are caused by multifactors similar to other chronic degenerative conditions, stress has been clearly implicated (Cossette et al 2001). Stress causes over- or under-activity of physiological systems which produces allostatic load. A study done on older Americans identified five established cardiovascular risk factors related to allostatic load (Seeman et al 1997). These include systolic and diastolic blood pressure, waist-hip ratio, ratio of total cholesterol to high density lipoprotein (HDL) cholesterol and HDL cholesterol level as well as raised concentrations of glycated hemoglobin, urinary epinephrine (adrenaline), norepinephrine (noradrenaline), cortisol and dehydroepiandrosterone sulphate. Studies found that altering of the HPA axis have linked these factors with long term exposure to adverse psychosocial circumstances (McEwen, 1998).

Many cardiovascular patients with high levels of stress continues to show decline in morbidity as stress affects mechanisms related to cardiac events especially clustering of traditional cardiovascular risk factors, endothelial dysfunction, myocardial ischemia, plaque rupture, thrombosis and malignant arrhythmias (Merz et al 2002).

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