Exercise Prevents Growth Hormone-Induced Insulin Resistance

Skeletal muscle is the most important tissue of glucose utilization after a meal. Growth hormone has been known to reduce insulin-stimulated glucose transport in muscles [9]. This adverse effect can be reversed by exercise. Hou et al. [13] present evidence indicating that exercise training prevents growth hormone-induced insulin resistance in rats by increasing muscle glycogen storage and GLUT4 protein levels. The importance of exercise to our health is once again shown to hold some scientific truth.

Wai Tan Kung as a Physiological Vagal Enhancer for the Elderly

Among the many Oriental conditioning exercises, Wai Tan Kung (WTK) is a traditional conditioning exercise practiced in Taiwan, and is said to be suitable for elderly people and patients with chronic diseases [3]. The underlying mechanism has not been adequately studied. Based on measurement of heart rate variability or hemodynamics, Lu and Kuo [28] conclude that in the short-term, WTK enhances vagal modulation and suppresses sympathetic modulation in the elderly. On the other hand, long-term practice of WTK enhances sympathetic modulation without compromising vagal modulation in the elderly.

Capsaicin Alters Respiratory-Related Hypoglossal Activity

Activation of pulmonary C fibers, the primary chemosensitive vagal afferents innervating the lung [12], with irritant gases evokes a cardiopulmonary reflex [22]. This centrally mediated reflex is considered to be beneficial because it prevents further insult by irritant gases. Lee et al. [24] found that pulmonary C fiber activation in rats by low and moderate doses of capsaicin decreases phrenic and hypoglossal nerve activities. Those effects are reversed after bilateral vagotomy. These observations suggest that pulmonary vagal C fibers may narrow the diameter at the oropharyngeal level by a decrease in phasic nerve activity, which may be disadvantageous to the maintenance of a patent upper airway.

807 C/T Polymorphism in Glycoprotein Ia Increases Blood Platelet Reactivity

Collagen is a major adhesive protein that mediates the adhesion of platelets after blood vessel injury, thus triggering the formation of hemostatic plug. α2β1 integrin is the major receptor for collagen, and polymorphisms in the gene encoding the glycoprotein Ia subunit affect the cell surface expression level of the receptor [20, 21]. Luzak et al. [29] report that the 807 T/T polymorphism, which does not change the amino acid sequence of glycoprotein Ia, correlates with increased platelet reactivity.

Induction of Plasminogen Activator Inhibitor-1 Gene via the MEK/ERK Pathway

Plasminogen activator inhibitor-1 (PAI-1) is the primary regulator of plasminogen activation and possibly extracellular proteolysis [27, 32, 34]. In anchorage-dependent cells, the PAI-1 gene is upregulated when cells begin to attach and is downregulated when cells are completely attached. Chang et al. [4] show that PAI-1 gene activation is mediated through MEK and p42/p44 MAP kinase (ERK), and may be regulated by molecules downstream from ERK such as Elk-1 and hypoxia-inducible factor-1.
**Biomedical Vignette**

### IL-1 Upregulates MMP-9 and -13 in Liver Myofibroblast Cells

Hepatic stellate cells play a fundamental role in the pathogenesis of hepatic fibrosis. Following liver injury, these cells change from quiescent cells to myofibroblasts. These myofibroblasts produce abundant extracellular matrix, which leads to the development of hepatic fibrosis [25]. They also produce matrix metalloproteinases (MMPs) to degrade extracellular matrix. Lee et al. [23] show that IL-1 produced from myofibroblasts by an autocrine manner upregulates the expression of both MMP-9 and -13. This suggests that during liver inflammation, myofibroblasts and Kupffer cells may participate in the remodeling of liver fibrosis through the production of IL-1.

### Role of crumbs in Development of Drosophila Eye

*Drosophila* eye development offers an easy system to analyze gene functions in vivo, and has become the model of choice to study human eye diseases. Signaling pathways such as EGF and receptor tyrosine kinase for patterning, differentiation and morphogenesis of the eye have been well characterized [33]. However, not much attention has been paid to the relationships between genes involved in cell polarity and eye development. The cell polarity gene, *crumbs*, plays a role in establishing cell polarity in ectoderm-derived epithelia. Mutations of *crumbs* result in progressive, light-induced retinal degeneration [16]. Fan et al. [10] used the gain-of-function strategy to study the function of *crumbs* in Drosophila eye development. They have dissected out distinct roles of *crumbs* at precisely timed stages during photoreceptor differentiation.

### Dopamine Synthesis and Transport in Synaptic Vesicles

Tyrosine hydroxylase (TH) is the rate-limiting enzyme in dopamine (DA) biosynthesis. Although regulation of the soluble form of TH and storage of DA in synaptic vesicles [11] have been extensively studied, little is known regarding the relationship between DA synthesis and its transport into synaptic vesicles. Chen et al. [6] report that the membrane-associated form of TH is activated by proton gradient-dependent protein phosphorylation and that there is a tight coupling between DA synthesis by the membrane-associated form of TH and DA transport into synaptic vesicles. These findings provide further support for generalization of the coupling model between neurotransmitter synthesis and vesicular transport into synaptic vesicles, as recently proposed for the GABA system [15].

### Downregulation of Polymeric Immunoglobulin Receptor mRNA during Colon Cancer Progression

The genesis of colon cancer is complex and progresses through many distinct stages of tissue changes [17]. The polymeric immunoglobulin receptor (PIGR) gene is abundantly expressed in normal colonic epithelium, where it mediates transport of locally synthesized IgA and IgM antibodies into intestinal secretions [31]. Downregulation of PIGR expression during progression of colon cancer has been reported, but the mechanism remains unknown. Traicoff et al. [36] studied the properties of the human PIGR gene in a novel in vitro model of progression of colonic adenoma to carcinoma. They provide mechanistic evidence that the downregulation of PIGR in colon cancer is due to mRNA instability.

### Bitter Gourd Extract Activates Peroxisome Proliferator-Activated Receptor-α

Peroxisome proliferator-activated receptors (PPARs) are lipid-activated transcription factors that control energy homeostasis through genomic action [35]. Chao and Huang [5] evaluated whether ethyl acetate extract of bitter gourd activates PPARα, using a clone of CHO K1 cells stably transfected with a (UAS)_1-tk-alkaline phosphatase report and a chimeric receptor Gal4-rPPARα LBD. They demonstrated that the extract activates PPARα to an extent that is equivalent to or even higher than that with 10 μM of Wy-14643, a known ligand of PPARα. Furthermore, a hepatoma cell line (H411EC3) treated with the bitter gourd extract showed a significant increase in mRNA and activity of acyl CoA oxidase and fatty acid binding protein.
Targeted Ablation of Gonadotrophs Depresses Prolactin Gene Expression

The gonadotrophs stimulate growth of cells expressing prolactin, or lactotrophs, during embryonic development. This paracrine stimulatory action was previously demonstrated in vivo by transgenic ablation of gonadotrophs in mice [30]. Vankelecom et al. [37] demonstrate that this developmental influence is exerted at the transcriptional level by selective upregulation of prolactin gene expression.

References


