EDITORIAL

WHAT WORKS: INSULIN OR THE NEEDLE?

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Proponents of the needle could argue passionately, that what really matters is the needle; the insulin is only a guise to get the needle in; they could quote, faith, pain, anticipation, yin and yang to buttress their position. Cytokines now seem to be the subject for the next great debate, such as "Monitoring blood glucose is a waste of time and money" (1).

Exercise does a lot of things from physiology to sociology, with biochemistry thrown in. In this issue, Ambarish et al (2) have suggested it does a bit of cytokines too in the form of tumour necrosis factor (TNFα). They required 54 healthy subjects aged between 18 and 30 years, and measured changes in TNF α following a single bout of moderate exercise, single bout of strenuous exercise and after one month of regular moderate exercise. They showed that the levels of TNF α fell after one month of regular moderate exercise.

Physical exercise is known to decrease insulin resistance by changing body composition, via metabolic changes in the skeletal muscle and improving insulin response in the liver (3) Glucose transport is increased via the GLUT4 translocation protein. In addtion exercise may alter cytokine levels, which mediate insulin resistance.

The level of TNF α, one of the cytokines implicated in the pathogenesis of insulin resistance (4) is positively correlated with obesity. It enhances lipolysis and inhibits adipocyte differentiation. In animals TNF α expression is particularly associated with genetic models of insulin resistance (5). It could be inversely related with the activity of adiponectin, an insulin sensitizing cytokine (6). Recently TNF α was shown to directly impair glucose uptake and metabolism by altering insulin signal transduction (7); a molecular connection between inflammation and metabolic syndrome was thereby suggested, in addition to actions of 'myokines' such as interleukin-6 and TNF α (8).

In an earlier study, Straczkowski et al measured their TNF α levels at baseline and after the exercise training in 16 obese women who participated in a 12-week exercise training programme (9). They exercised for 30 mins, five days a week on a bicycle ergometer, at 70% maximal heart rate. The levels of TNF α fell after the training programme both in those with normal glucose tolerance (n:8) and with impaired glucose tolerance (n:8). The change was independent of alteration in body weight, and was attributed to muscle contraction, which may directly regulate TNF α expression. The authors hypothesized that 'muscle activity may be more important than muscle mass' (9).

However, it should be realized that change in TNF α is only one among a host of other factors which mediate the beneficial effects of exercise such as altered levels of other cytokines (10), gene expression (11), fuel metabolism and psychological benefits. Considering that the human body was primarily constructed to a life of physical activity (11), and that alterations in lifestyle have led to increasing prevalence of sedentary habits (12), the consensus advise is for 30 minutes of moderate-intensity activity a day for sedentary adults (13).

This interaction fits into the broad scope of evolution: the endocrine and immune systems evolved to 'feed and defend the human organism' (14). Changes in lifestyle (abundant availability of food, decrease for need of physical exercise, dietary changes) have not yet been factored into the human genome, which continues to function for a 'hunter-gatherer' mode of living; in contrast to mutation rate in bacteria, human genome mutated only 0.5% for every 106 years of evolution.

So proponents of the needle, truce with you: let the needle go in, along with the insulin.

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