

Insulin receptors in disease and alone

The membrane molecules, or receptors, that sense specific chemicals are a cell's window on the extracellular world. The effects of insulin, for example, depend on the amounts and binding strengths of specific receptors. Diabetes may result from insufficient or blocked receptors, as well as from insufficient insulin (SN: 3/24/70, p. 182).

Two other diseases, besides diabetes, now appear to be associated with insulin receptor defects. At the recent Endocrine Society Meeting in Anaheim, Calif., scientists from the National Institutes of Health reported insensitivity to insulin in cells in an infant with severe growth retardation. The child has a congenital syndrome known as Leprechaunism (the symptoms are low birth weight, abundant body hair and elfin facial features) and very high blood insulin levels. Ellen E. Schilling and collaborators say their findings are "the first report of a genetic insulin receptor defect in man."

Changes in insulin receptors may also have an effect on aging. Dorothy B. Vilee and colleagues at Children's Hospital Medical Center in Boston have examined responsiveness to insulin among cells from normal persons of different ages and from patients with progeria — a rare disorder that mimics aging. Children with progeria lose their hair, develop thickened, wrinkled skin and usually die of coronary disease in their early teens. Cells from normal youngsters grow rapidly in the laboratory and, when exposed to insulin, increase protein and glycogen production. Cells from elderly persons or patients with progeria grow at one-fourth the normal rate and show little or no response to insulin. The investigators suggest that aging changes in cell membranes or in their receptors render the cells less able to respond to external stimuli.

A more complete understanding of the mechanism of insulin action, as well as the mechanisms of associated diseases, depends on analyzing the composition and structure of the receptor, says Len Harrison of the National Institutes of Health. He reports a novel method for purifying large quantities of insulin receptors for analysis. Harrison attaches to a solid matrix substances known to selectively bind insulin receptors — a plant lectin and antibodies isolated from patients with autoimmune insulin resistance. Harrison reports that the receptor appears to be a complex protein containing sugar groups. He hopes the purified receptor will soon allow "a molecular explanation for observed alterations in receptor function both in health and in disease."

Testosterone and the male sex drive

Does an excess of the male sex hormone testosterone increase sex drive? Maybe and maybe not, according to studies by S. Mitchell Harman and colleagues of the Gerontology Research Center in Baltimore that were reported at the meeting of the Endocrine Society.

Harman and co-workers have found, as have numerous other researchers, that the sexual activity of healthy men decreases sharply with age. Testosterone levels, however, do not decrease as men grow older, suggesting that a declining sex drive should not be blamed on a decrease in testosterone.

On the other hand, Harman and his team *have* found that sexually active men older than 70 years of age have higher levels of testosterone than do men past 70 who are not sexually active. So sexual activity and testosterone are linked in some manner. The question is how. Can an excess of testosterone counter a waning sex drive — a drive that is declining for some reason other than lack of testosterone? Or might increased sexual activity boost testosterone production? Harman and co-workers are not yet sure which hypothesis is correct.

Exercise keeps them young

Constant, strenuous exercise delays a girl's puberty, reports Michelle P. Warren of Columbia University College of Physicians and Surgeons. A young ballet dancer has her first menstrual period, on the average, almost three years later than age-matched controls or music students (15.4 years old compared to 12.5 or 12.9), Warren said at the Endocrine Society meeting. Although other scientists have proposed that menstruation first occurs at a critical weight and body fat level, that hypothesis does not completely explain Warren's findings. The dancers are lighter and have less fat than their more sedentary, same-age peers, but the dancers' weights and fat levels at menarche are higher than those of the controls at earlier, first menstruations. Warren further suspects exercise plays a direct role in postponing menarche, because onset of menstruation and breast development for dancers usually occurs not during periods of weight gain but during inactivity due to injury or vacation.

The milk hormone and sexual function

Prolactin is the hormone essential for human milk production and for lactation. But its blood level in men (and in non-lactating, non pregnant women) is substantial. While prolactin has reproductive importance among some male animals, its role in men has remained a mystery. Now Stanley Deutsch and Lawrence Sherman present a clue. They reported at the Endocrine Society meeting that blood prolactin concentrations were markedly decreased in impotent men and men with premature ejaculation attending the Long Island Jewish-Hillside Medical Center Program in Human Sexuality. Other hormones were normal. The researchers find this result surprising because elevated prolactin levels are also known to cause sexual dysfunction.

Pap smears: Are they worth it?

Women are strongly encouraged by health organizations to have a yearly "Pap" smear for cervical cancer, a common form of cancer that can be treated effectively if caught early. But are Pap smears really a preventive against cervical cancer, ask E. Aileen Clarke of the Ontario Cancer Treatment and Research Foundation and Terence W. Anderson of the University of Toronto.

They compared the Pap-smear history of 212 women with advanced cervical cancer to that of 1,060 age-matched controls without cancer. In the five years before the year of cancer diagnosis, 32 percent of the women with advanced cancer had had a Pap smear. Yet during the same period, 56 percent of the women without cancer had had one. This difference, they report in the July 7 LANCET, was highly significant and indicated a relative risk of invasive cancer of 2.7 in women who had not been screened by a Pap smear compared with those who had. The researchers conclude that the Pap smear is a cervical cancer preventive.

Medical science gets low grades

Science reported in three highly respected medical journals — the LANCET, the NEW ENGLAND JOURNAL OF MEDICINE and the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION — is not necessarily up to snuff, charge Robert Fletcher and Suzanne Fletcher of the University of North Carolina Medical School.

The Chapel Hill investigators analyzed 612 studies published in the above journals between 1946 and 1976. They found that almost half of them were not based on the best available scientific methods, and that 56 percent of 155 studies conducted in 1976 were founded on data collected before the research had been planned. Only 24 percent of the 151 articles reviewed in 1946 were based on previously available data.