

class assignment #4

Read the article “Insulin inaction may hurt even non-diabetics” and use a search engine such as Google to answer the following questions. Be sure to cite *complete* references where appropriate. This assignment is due by 1:30 p.m. on Friday, 8 February. You may e-mail your answers (subject is 102#4 Your Name) or word process and turn them in to lecture (Thursday) or my office by 1:30 p.m. on that Friday. 12 points.

1. *According to this article*, what is the function of insulin in the body?
2. The article talks about insulin resistance. *According to this article*
 - a. what is insulin resistance?
 - b. what fraction of non-diabetic US adults are thought to be insulin resistant?
 - c. what happens to insulin levels in insulin resistant individuals?
3. What does *this article* point out is a problem brought on by high levels of insulin circulating in the blood?

Do some research for answers to the next three questions.

- 4 How is insulin resistance related to metabolic syndrome X?
5. What are five characteristic disorders that help to define metabolic syndrome X in an individual?
6. What is the best treatment for metabolic syndrome X (and/or insulin resistance)?

Insulin inaction may hurt even nondiabetics

People with adult-onset diabetes face triple the coronary heart disease risk typical of the general population. A new study suggests that the problem may trace to an impaired response to insulin, a condition also known as insulin resistance. This could explain why controlling elevated concentrations of sugar in the blood—a problem that occurs downstream of this impairment—doesn’t eliminate that increased heart disease risk.

It also suggests that people without diabetes but who have insulin resistance (SN: 4/8/2000, p. 236)—up to one-third of U.S. adults—may face a similar risk.

The body dispatches insulin to tell cells when to take in a primary fuel, blood sugar. For unknown reasons, cells in people with insulin resistance begin ignoring the hormone’s commands. The body responds by creating ever more insulin—at a price. The excess somehow instigates biochemical changes that damage blood vessels.

To learn when and how this damage occurs, endocrinologist Gerald M. Reaven of the Stanford University School of Medicine and his colleagues studied 36 healthy, nondiabetic men and women, at least one-third of whom turned out to be highly resistant to insulin. Because oxidation of fatty substances in the blood can contribute to the artery-clogging plaque characteristic of heart disease, the researchers measured peroxides, which are residues of recently oxidized fats, and antioxidants in blood samples.

In the September AMERICAN JOURNAL OF CLINICAL NUTRITION, Reaven’s group reports

that the insulin-resistant group had more than three times the concentration of lipid peroxides as the 12 most insulin-sensitive volunteers did. Moreover, insulin-resistant participants had far lower concentrations of antioxidants—including five carotenoids and vitamin E—than the insulin-sensitive volunteers did.

“In these clearly nondiabetic individuals,” Reaven says, “we see evidence that insulin resistance is associated with oxidation [of fats in the blood],” perhaps foreshadowing atherosclerosis.

“I think this study is intriguing and novel,” observes Balz Frei of Oregon State University in Corvallis. However, he adds, its link between insulin resistance and excess oxidation of blood fats “is only suggestive—far from conclusive.” Frei says he’d like to see confirmation of the peroxide measurements and also initiation of dietary surveys to establish whether low antioxidant concentrations reflect food choices or the body using up antioxidants more rapidly.

If the latter proves true, “it raises the possibility that [accelerated] oxidation may be responsible for the atherosclerotic risk associated with insulin resistance” even in healthy, nondiabetic individuals, says American Diabetes Association President Robert Sherwin.

Right now, “we really don’t understand how insulin resistance leads to atherosclerosis,” laments Sherwin, an endocrinologist at the Yale University School of Medicine in New Haven, Conn. He says that the provocative data offer new clues for investigating this.

— J. Raloff