

life sciences

METABOLISM

Vitamin B-6 tied to pregnancy disease

Hypertension, convulsive seizures, coma and possibly death characterize a disease called toxemia of pregnancy that kills 30,000 infants a year, not infrequently causing death of the mother as well.

"Our general lack of knowledge concerning toxemia of pregnancy continues to be abysmal," says Dr. Jack A. Klieger, who, with co-workers at St. Joseph's Hospital, Milwaukee, is studying the sources of this disease.

It is a metabolic disturbance, related to either a deficiency or an abnormal absorption of vitamin B-6. Toxemic women do not handle this vitamin, essential to the body's use of protein-building amino acids, the way a normal pregnant woman does, Dr. Klieger told a meeting of the New York Academy of Science last week.

His studies reveal that the placentas of toxemic women are markedly deficient in vitamin B-6. The vitamin, he says, plays an important role in biochemical reaction of proteins thought to be vital to placental and fetal growth.

Because B-6 deficiency in toxemic women cannot be cured by administering the vitamin, Dr. Klieger postulates that the deficiency may be due not to a real lack of B-6, but to failure to be able to utilize it.

BIOCHEMISTRY

Enzyme action revealed

Without enzymes, biochemical reactions would be impossible. Michigan State University scientists now report experiments showing how one key enzyme changes in response to the body's needs.

An enzyme known as GAPD (glyceraldehyde-3-phosphate dehydrogenase) is active in the manufacture of the body's energy chemical ATP (adenosine triphosphate). When the body has made enough ATP to meet its energy needs, Dr. William C. Deal and co-workers find, the GAPD molecule splits into two to four chains. The separate chains have no enzyme action and can no longer make ATP.

Then, if a person begins to run, for example, and uses up much of the ATP, his body responds by turning its energy switch on. The GAPD chains recombine, enzyme activity is restored, and more ATP is produced. The ATP control mechanism probably also applies to other enzymes as well, Dr. Deal suggests, and may explain why certain plant and animal enzymes are active only at certain times.

EVOLUTION

Animals and plants linked

Cows and pea plants have a common ancestor. Man, too, presumably has a place on the same immense family tree, billions of years old.

A protein known as histone-4, isolated from the thymus gland of a calf, is almost identical to histone-4 proteins isolated from pea seedlings. Drs. Douglas Fambrough and James Bonner of the California Institute of Technology, Pasadena, and Drs. Robert Delange and

Emil Smith of the University of California at Los Angeles suggest that histone-4 may be the oldest protein known. It is one of six types of histone proteins that are attached to DNA (deoxyribonucleic acid) within a cell's nucleus.

Histone-4, like all proteins, is made up of a series of amino acid molecules hooked together. In both cows and peas, the protein is composed of 102 amino acid molecules, using 18 of the 20 possible kinds, strung together in precisely the same order except for molecules 60 and 77. The difference between cow and pea histone-4 proteins, thus, is very slight, suggesting that there has been very little change during long periods of biological time.

Though they add another piece of information to biochemical studies of evolution, the function of the proteins within the nucleus remains unknown.

PROTEINS

Light shed on calcium absorption

A new, nameless protein that plays an essential role in the body's use of bone-building calcium has been isolated. It may help researchers understand the biochemical basis of certain diseases associated with a deficiency of calcium, including rickets, according to Dr. Robert H. Wasserman of Cornell University, Ithaca, N.Y.

The protein, first discovered in chicks and later found in monkeys, dogs and calves, binds to calcium in the intestine. In some still unknown fashion it then facilitates the passage of calcium from the intestine to the blood stream so that it can be used for bone formation.

Dr. Wasserman and co-workers discovered the protein while they were investigating the role of vitamin D in calcium absorption from the intestine. The protein apparently cannot be made unless vitamin D is present. The more of the protein in the intestine, the greater an animal's ability to absorb calcium. "We have every reason to believe that there is a similar protein in man," Dr. Wasserman says.

NUTRITION

Recommended calorie intake lowered

The Food and Nutrition Board of the National Research Council has lowered its recommended daily calorie allowance for adults, in response to a continuing decline in the physical activity of the average adult American and to a corresponding tendency to national overweight.

The recommendation for the reference man (22 years old, 154 pounds, and moderately active) has been dropped from 2,900 to 2,800 calories a day and for the reference woman (22, 128 pounds, and moderately active) from 2,100 to 2,000 calories a day.

The new figures are part of a revision of the board's Recommended Dietary Allowances, last published in 1964. This report is intended to be a food planning guide for large groups rather than an inflexible standard, the board says.

Recommended allowances are calculated for 24 age groups of men, women, children and infants.