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Short Communication

Learning Nutrition from Nutrient Sciences of History

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Introduction

Modern nutritional science is surprisingly young. Nevertheless, there are many researcher of sciences be participating of the development of nutritional science history. Less than 100 years ago, Nutrition research started from human clinical or animal clinics. That is, History of nutritional sciences began from lab experimenting and practicing thoughts. Hence, students learning history of nutrientnal sciences to empowers students to learn conception and apply them professionally in practiciing filed.

Vitamin B1

In the early years, McCollum and Davis started proving that rats failed to growth because the lab rats ate some food to lead to poor growth. Experimenting with two different rats' diets, added to only butterfat and an additional extra of the diet supplement. Result added to the addition of the supplement of diet is to heal and expect growth. In another story, Chemist Casimir Funk noticed the symptoms of beriberi in chickens; Then, he used chickens in the laboratory to feed leftover rice with processed until a new cook changed brown rice. The chickens soon recovered from beriberi. The birds got well again a few days after switching to brown rice to birds. Eijkman thought that processing rice lacked a dietary component found in brown rice to causing beriberi was absent from the dietary ingredient, which he called "the anti-beriberi factor." Finally, Korsakoff studied the effects of alcoholism on the nervous system and drew attention to several cases of alcoholic polyneuropathy with distinctive mental symptoms (Korsakoff's syndrome) due to the defense of Vitamin B1.

Finally, Eijkman proved that causing beriberi factor is not due to blood contamination, respiratory metabolism, or temperature variation. Instead, it is due to the miss compound nutrient of vitamin B1. Interest in extracted food nutrients began in the latter half of the 19th century with the name of Thiamin as the first water-soluble vitamin. Eijkman with Sir Frederick Hopkins won the 1929 Nobel Prize for Medicine.

Vitamin B2

Following Thiamine of the discovery, researchers realized that one or more additional water-soluble factors called the vitamin B2 complex. Observing a pigment in milk with yellow-green, whole wheat, yeast, and liver began by chemist Alexander Wynter Blyth in 1872. Until late 1991, Riboflavin was vitamin B2 to be isolated. They thought no nutritional disease causes riboflavin deficiency until they experimented with young rats to feed with the food extract and observed that the young growth is outstanding to prove. Riboflavin's growth-stimulating properties. Riboflavin is the precursor of Flavin adenine dinucleotide (FAD) and flavin mononucleotide (FMN). Several oxidation-reduction (redox) reactions are involved in energy production, and numerous metabolic pathways act as electron carriers. Riboflavin deficiency can affect multiple paths in the metabolism of vitamin B6, folate, niacin, and iron. Causing preeclampsia in pregnant women is due to Riboflavin deficiency. This condition may progress to eclampsia and cause severe bleeding and death. The risk of preeclampsia is associated with a genetic variant (C677T) in the methylenetetrahydrofolate reductase (MTHFR) gene. This gene codes for the MTHFR enzyme, which is FAD-dependent.

Riboflavin deficiency is extremely rare in the United States. Riboflavin deficiency of the signs and symptoms include skin disorders, hyperemia and edema of the mouth and throat, angular stomatitis, cheilosis, hair loss, reproductive problems, sore throat, itchy and red eyes, and degeneration of the liver and nervous system. People with riboflavin deficiency typically have deficiencies of other nutrients, so some of these signs and symptoms might reflect these other deficiencies. Severe riboflavin deficiency can impair the metabolism of other nutrients, especially other B vitamins, through diminished levels of flavin coenzymes. Anemia and cataracts can develop if riboflavin deficiency is severe and prolonged.

Vitamin B6

In the 1930s, Rudolf Peters showed that rats developed 'rat acrodynia,' characterized by severe cutaneous lesions. The young rats fed on a semi-synthetic diet with added Thiamin and Riboflavin and no other supplement. Then, in 1934, the Hungarian physician Paul György discovered a substance that could cure a skin disease in rats (dermatitis acrodynia). He named this substance vitamin B6. In 1938, Samuel Lepkovsky isolated vitamin B6 from rice bran. In 1934, Paul György showed that the factor which cured 'rat acrodynia' was vitamin B6. However, other studies soon showed that vitamin B6 deficiency produced convulsions in rats, pigs, and dogs and microcytic anemia in certain animals.

Samuel Lepkovsky successfully isolated and crystallized vitamin B6 from the rice in 1938. The following year, Leslie Harris and Karl Folkers, Richard Kuhn, and his associates independently showed that vitamin B6 was a pyridine derivative 3-hydroxy-4, 5-dihydroxy-methyl-2-methyl-pyridine. The pyridoxal, pyridoxamine, and pyridoxine can convert into the enzymatically active form of pyridoxal-5-phosphate. The pyridoxal-

5-phosphate plays a role in various enzyme systems, especially in amino acids metabolic utilization and transformation.

Vitamin B12

During the 1920s, George Whipple discovered that feeding large amounts of raw liver to cure the blood loss anemia in dogs most rapidly. They also identified the hypothesis that eating the liver might treat pernicious anemia. Edwin Coh prepared a liver extract that was 50 to 100 times more potent in treating pernicious anemia than natural liver products. William Castle discovered that gastric juice contained an "intrinsic factor," a glycoprotein that formed a complex with vitamin B12, promoting its absorption through ileal receptors. Vitamin B12 works with many other B vitamins to carry out critical roles in the functions of the human body. For example, vitamin B12 combined with folate and vitamin B6, cobalamin helps maintain normal blood homocysteine levels. Subsequently, the various biochemical roles of vitamin B12 were elucidated, including its essential interaction with folate and their common link with megaloblastic anemia. In addition, many early clinical studies recognized that vitamin B12 deficiency also caused severe neuropathy leading to paralysis and death. At the same time, Post-Mortem analysis demonstrated spinal cord demyelination. However, vitamin B12 is still the subject of intense research, and, in particular, its role in preventing these irreversible neurological lesions remains unclear. The valuable contribution of clinical reports and studies of patients with pernicious anemia throughout the 19th century resulted in enough clinical definition to allow the treatment of the condition, leading them to a Nobel Prize. Minot and Murphy1964.

Folate

In the 1920s, scientists recognized that folate deficiency and anemia were the same conditions. Lucy Wills' research on anemia in pregnant women gives a folic acid that helps prevent congenital disabilities in babies in1928. She conducted seminal work in India in the late 1920s and early 1930s on macrocytic anemia during pregnancy. During the research on pregnant textile workers in Mumbai, her observations led to discovering a nutritional factor has both prevents and cures this disorder. In 1931, researcher Lucy Wills made a critical observation that identified folate as the nutrient required to avoid anemia during pregnancy. In addition, Wills demonstrated that anemia could reverse anemia with brewer's yeast. In the late 1930s, sciences discovered folate as the substance in brewer's yeast. Moreover, it can take the extracting folate from dark-green leafy vegetables. Later identified as folic acid, improved the monkeys' health during the research, named the Wills Factor.

Macrocytic anemia is enlarged red blood cells and is a life-threatening condition. In 1960, researchers linked folate deficiency to the risk of neural tube defects. In the early 1990s, well-designed randomized trials established that folate supplementation could prevent neural tube defects. Therefore, 62 countries started mandating food fortification with folic acid in December 2018.

Vitamine C

Centuries ago, sailors experienced such swollen and bleeding gums, loose teeth, hemorrhaging under the skin, and slowed healing of wounds for extended distances without fresh food and supplies. This medical condition called scurvy is the primary cause of disability and mortality among sailors on long sea voyages. By 1753 scurvy was recognized in the British medical community as directly related to dietary deficiency. In 1769, William Stark, a young British physician, used himself as the experimental subject on diet and nutrition; he ate only bread and water for 31 days. After adding other foods to his diet with olive oil figs, goose meat, and milk. His clinical examed recorded that his gums were red and swollen, bleeding easily to touch for 60 days. Seven months later, he self-sacrificed his life for this experiment. His diet was the highest fat of meat and starch without citrus fruits and fresh vegetables. It took more years, Albert Szent-Györgyi isolation of vitamin C, an essential substance for use within cells for the metabolic system. Then, he was recognized for a Nobel Prize in physiology medicine.

Vitamin A

Many arguments who was first to discover vitamins A, but it is not essential to know about that. In this essay, Gowland Hopkins fed young rats on casein, lard, sucrose, starch, and minerals as well half of the rats were also fed by milk daily. Those given by the milk grew well better than no fed by the group's milk after two weeks; he found that those receiving the milk normally developed, and those lacking did not develop well. He felt that similar problems might be present in human diseases related to diet. Elmer McCollum found that rats started healing when given a purified diet and started losing weight after ten weeks but would recover after feeding allotted butter fat, but not olive oil.

Night blindness, a condition that a person cannot see in dim light, has been known since ancient Egyptian times. Certainly, Hippocrates, who lived 460–325 BC, recommended eating raw liver to cure night blindness with nutrients, thus identifying a link between night blindness and nutrition. In addition, many physicians and scientists discovered night blindness, often with malnutrition. People's nutrient deference is related to dryness of the cornea and conjunctiva (xerophthalmia). Osborne and Mendel's experimental work discovered one essential nutritional factor in these foods, and McCollum and Davis named it "extra fat-soluble factor," later called "fat-soluble vitamin A.

Furthermore, the sciences proved their hypothesis to design an experiment of charts for five rats, observing their weights over time compared to an average growth curve. One chart showed their results with a fat-free diet; rats could not grow without an egg or butter extract substance, even though they appeared to be healthy. They concluded that rats stop growing until to feed certain "either extracts of egg or butter" of essential for average growth for extended periods." The first is that a lack of nutrients in the diet components could be harmful. Second, Gowland Hopkins had isolated and discovered the essential nature of the amino acid tryptophan molecule. They also found this food factor in extracts of alfalfa leaves and organ meats. McCollum called "factor A" was later called vitamin A.

Vitamin D

A Johns Hopkins pediatrician thought that diet causes rickets. McCollum's research during the early 1920s found that rats fed with a plain diet led to developing rickets. After that, His group tested more than 300 diets on rats, finally finding that cod-liver oil could prevent rickets. Further, more tests found that the oil could no longer cure night blindness but can cure rickets in rats. After that, he named the substance for the following free letter of the alphabet, vitamin D. Furthermore, they tested that sunshine and cod liver oil protected against rickets and tested this by carrying children outside to the sun. Soon after, many children grew up with fed cod-liver oil; these children of rickets completely went away. The discovery in 1919-1924 of vitamin D and its production in skin and foods by UV irradiation to eliminate rickets is a significant medical problem. The physician used vitamin D to mineralize the skeleton to prevent rickets in children, osteomalacia, and adults early in the 1960s. Understanding how this Vitamin D facilitates calcium transport across the intestinal membrane keeps mineral homeostasis. Sciences discovered that vitamin D must first be activated by 25-hydroxylation in the liver followed by one alpha-hydroxylation in the kidney to produce the vitamin D hormone one alpha,25-dihydroxy vitamin D3 [1,25-(OH)2D3]. This process is strongly feedback-regulates plasma calcium and phosphorus concentrations. Furthermore, it is a primary endocrine system regulating bone mass and state.

Vitamin E

In 1920 Mattel and Conklin investigated milk as the "perfect food." They wanted to determine "if milk could be an adequate food for the whole span of life for the normal performance of a physiological function." They fed a diet of fresh whole milk to rats for their entire life span. The rats grew well initially; after 50 Days, growth declined, and the females did not reproduce. Given whole dried milk, obtained commercially, food consumption was more significant than fresh milk. Again, growth was average, but there was no reproduction. When 10% butterfat was added to the diet, replacing that amount of starch, the rats were still sterile.

Furthermore, Vitamin E (α-tocopherol) was found nearly 100 years ago. Proving the human diet has eight different vitamin E-related molecules synthesized by plants. Despite these molecules being per-oxyl radicals scavengers, the human body prefers α-tocopherol. They used oral alpha-tocopherol fed with premature infants. The result of vitamin E supplementation reduced the risk of intracranial hemorrhage and retinopathy. However, it noted an increased risk of sepsis in preterm infants and women miscarriage. The biological activity of vitamin E depends on regulatory mechanisms that retain α-tocopherol and excrete the non-α-tocopherol. In addition, α-Tocopherol functions as a radical scavenger to protect polyunsaturated fatty acids and lipoproteins. The most likely explanation for why humans require vitamin E is a fat-soluble antioxidant. Vitamin E was first isolated in a pure form by Evans and Gladys Anderson Emerson in 1935 at the University of California, Berkeley.

Conclusion

Above the story shows how vitamins were discovered from a medical curiosity to a daily routine for millions of people, including understanding malnutrition and developing protocols to prevent it. In addition, nutrition scientists continue to develop new organic chemistry and biochemistry skills to improve humans and animals by discovering new nutrients for healing nutritional conditions

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