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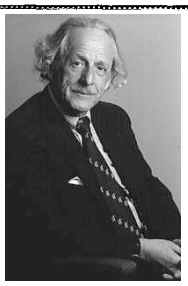

Current Comments®
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Journal Citation Studies. 49. The Diverse Yet Essential Nutrients in the Information Diet of Nutrition Researchers

Number 28 July 11, 1988

Using ISI® citation data, we identified the hot research areas, core and ancillary journals, and *Citation Classics®* for nutrition research. The data confirm the dominant role of the *American Journal of Clinical Nutrition*, the *British Journal of Nutrition*, and the *Journal of Nutrition*.

Our most recent journal citation studies identified the most important journals in the fields of oceanography and developmental biology.[1,2] As in past studies, one of our primary aims is to identify the journals that form the core of the field (here, nutrition) as well as the highly cited noncore journals that are of interest to the field.

In a recent essay we discussed the field of nutrition research and focused on the topics currently drawing intense interest from nutrition workers.[3] In using citation analysis to pinpoint these "hot" areas of research, we not only highlighted these trends but also showed how they link to work in other fields. In this essay our focus is on the literature of nutrition researchers and the journals that publish it.

Hot Journals and Areas of Nutrition Research

Table 1 shows the 1987 research fronts that include at least 30 citing articles that were published in the "core" nutrition journals that year. We identified 19 core journals for this study (Table 2). Of course, not every journal that publishes nutrition research appears in this list. Such a list would be vast indeed and would require inordinate time and space to analyze. Table 2 does, however, represent the most significant journals for nutrition research.

We created Table 2 by consulting the 1986 *Science Citation Index®* (*SCI®*) and the 1986 *Journal Citation Reports®* (*JCR®*), the annual compilation of citation linkages between journals that ISI® derives from the *SCI*. We also solicited the advice of experts in nutrition and carefully examined the citation records of the 23 journals listed under the heading "Nutrition" in the *SCI*. The journals in Table 2 mainly publish works on general subjects in nutrition research and are the ones most cited in this discipline.

R.K. Chandra, editor-in-chief, *Nutrition Research* and *Progress in Food and Nutrition Science*, and professor, Department of Pediatrics, Medicine, and Biochemistry, Memorial University of Newfoundland, St. John's, Canada, suggests that several factors may influence the citation patterns of nutrition journals and affect their place in an analysis of this type. According to Chandra:

> One major determinant of the number of citations or the number of frequently cited articles is the age of the journals. It is unfair to compare "oldies" published for over 25 years with the "new pioneers" of less than 8 years. Secondly, the citation frequency may be dependent upon whether the publication is the *official organ* of a society or an independent journal. In the case of the former, the captive readership is more likely to cite articles in that journal.[4]

Chandra also believes that if journal self-citations are frequent in a journal, the citation data may actually be indicative of "self-aggrandizement rather than good quality."[4]

Table 1: The 1987 *SCI*®/*SSCI*® C1-level research fronts that include at least 30 citing documents published in core nutrition journals. A=number of articles from core nutrition journals in the citing documents for the front/number of citing documents in the front. B=total number of articles from core nutrition journals in the cited documents for the front/number of cited documents in the front.

Number	Name	A	B
87-0044	Radiofrequency capacitive hyperthermia for deep-seated tumors, anthropometric prediction, and body density	32/386	2/52
87-0595	Postmenopausal osteoporosis and bone mass	31/497	3/57
87-0763	Low birth-weight infants, fortified formula, and high calcium excretion	37/266	3/39
87-0845	Dietary fiber, enzyme-resistant starch, and lactose digestion in milk intolerance	61/304	7/39
87-0862	Dietary fiber and traditional starchy foods	61/126	4/9
87-1018	Risk of cancer, plasma selenium, serum carotenoids levels, and leukocyte zinc concentrations	41/514	2/55
87-1282	Total parenteral nutrition in critically ill surgical patients	58/190	1/15
87-1406	High-density lipoprotein and LDL receptor in familial hypercholesterolemia	45/1,205	0/39
87-1572	Nutritional support and surgery	51/209	2/21
87-1681	Fish oil, dietary eicosapentaenoic acid, and prostanoid metabolism	64/403	3/27
87-2756	Whole-body protein turnover and kinetics of human amino-acid metabolism	42/212	2/18
87-3685	Nutritional status in Peruvian children and rural Bangladesh, and growth standards	32/122	2/14
87-4839	Brain 5-hydroxytryptamine metabolism, plasma tryptophan, serotonin levels during glucose tolerance testing, and carbohydrate cravers	31/193	2/15

The most active research front in terms of participation by nutrition articles from journals in Table 2 is entitled "Fish oil, dietary eicosapentaenoic acid, and prostanoid metabolism" (#87-1681). With recent findings that suggest that fish oil in the diet decreases the risk of heart disease, it is not surprising that this topic would be receiving a lot of attention. What is surprising, however, is that more of the articles in this front were not published in nutrition journals. Of the more than 400 articles published on this topic in 1987, only 64 are from the core nutrition journals listed in Table 2. Twenty-seven articles comprise the cit*ed* core of this front. Of these, however, all but three were not published in the nutrition journals in Table 2—and these were from the *American Journal of Clinical Nutrition*.

T.O. von Lossonczy and A. Ruiter, Institute for Fishery Products, Netherlands Organization for Applied Scientific Research (TNO), IJmuiden; H.C. Bronsgeest-Schoute and R.J.J. Hermus, Department of Human Nutrition, Agricultural University, Wageningen; and C.M. van Gent, Gaubius Institute, TNO, Leiden, The Netherlands, wrote one of these three papers.[5] The lowering effects of a fat-fish (for example, mackerel) diet on blood serum lipids are discussed in this 1978 article. This article has been cited 120 times thus far. A second paper, a 1986 review article by Pauline M. Herold and John E. Kinsella, Institute of Food Science, Cornell University, Ithaca, New York, describes the link between fish-oil consumption (specifically, n-3 polyunsaturated fatty acids that are found in many types of fish) and the decreased risk of cardiovascular disease.[6] This article has been cited in more than 40 subsequent publications. The third core article from the *American Journal of Clinical Nutrition* is by D.M. Hegsted and colleagues, Department of Nutrition, Harvard School of Public Health, Boston, Massachusetts, and will be discussed later along with other most-cited articles from the key nutrition journals.

Also among the core of research front #87-1681 are two papers by J. Dyerberg, Department of Clinical Chemistry, Ålborg Hospital, Denmark, and colleagues.[7,8] Although both papers were published in *Lancet* (one in 1978 and one in 1979), which is not a core nutrition journal, they need to be mentioned here. Both describe the low incidence of cardiovascular disease, especially myocardial infarction, among Eskimos in Greenland, whose diets were rich in polyunsaturated fatty acids. As Leonard A. Cohen, head, Section of Nutritional Endocrinology, American Health Foundation,

Table 2: Core nutrition journals indexed in the *SCI*® in 1986, with their editors, years of origin, and publishers. An asterisk (*) indicates that a journal has changed its title since the first year of publication.

*American Journal of Clinical Nutrition (1952)
A.I. Mendeloff, ed.
American Society for Clinical Nutrition
Bethesda, MD

*Annals of Nutrition and Metabolism (1947)
N. Zollner, ed.
S. Karger
Basel, Switzerland

Annual Review of Nutrition (1981)
R.E. Olsen, ed.
Annual Reviews
Palo Alto, CA

British Journal of Nutrition (1947)
R.H. Smith, ed.
Cambridge University Press
Cambridge, United Kingdom

Ecology of Food and Nutrition (1971)
J.R.K. Robson, ed.
Gordon and Breach
London, United Kingdom

*Human Nutrition—Clinical Nutrition (1947)
J. Stephen, ed.
John Libbey
London, United Kingdom

*International Journal for Vitamin and Nutrition Research (1932)
G. Ritzel, ed.
Hans Huber
Bern, Switzerland

International Journal of Obesity (1977)
P. Bjorntorp, ed.
John Libbey
London, United Kingdom

Journal of Nutrition (1928)
L.S. Hurley, ed.
American Institute of Nutrition
Bethesda, MD

*Journal of Nutritional Science and Vitaminology (1954)
K. Ashida, ed.
Center for Academic Publications Japan
Tokyo, Japan

Journal of Parenteral and Enteral Nutrition (1977)
H.M. Shizgal, ed.
Williams & Wilkins
Baltimore, MD

Journal of Pediatric Gastroenterology and Nutrition (1982)
E. Lebenthal & E. Rossi, eds.
Raven Press
New York, NY

Journal of the American College of Nutrition (1982)
M.S. Seelig, ed.
Alan R. Liss
New York, NY

Journal of the American Dietetic Association (1925)
E. Monsen, ed.
American Dietetic Association
Chicago, IL

Nutrition Reports International (1970)
A. Albanese, ed.
Butterworths Publishers
Stoneham, MA

Nutrition Research (1981)
R.K. Chandra, ed.
Pergamon Press
Elmsford, NY

Nutrition Reviews (1942)
R.E. Olson, ed.
Nutrition Foundation
Washington, DC

Proceedings of the Nutrition Society (1944)
R.H. Smith, R.F. Gumble & N.F. Suttle, eds.
Cambridge University Press
Cambridge, United Kingdom

Progress in Food and Nutrition Science (1975)
R.K. Chandra, ed.
Pergamon Press
Elmsford, NY

Valhalla, New York, points out, "It was Dyerberg who opened up the fish oil-eicosanoid field with his study on the Greenland Eskimos in the early and mid-1970s."[9]

Two related research fronts—#87-0862, "Dietary fiber and traditional starchy foods," and #87-0845, "Dietary fiber, enzyme-resistant starch, and lactose digestion in milk intolerance"—each produced 61 current citing articles from the core nutrition journals in Table 2. Of the nine articles comprising the cited core of #87-0862, four are from the *American Journal of Clinical Nutrition*. Two are by James W. Anderson and colleagues,[10,11] University of Kentucky College of Medicine, Lexington. The beneficial effects of high-fiber foods on lipid and carbohydrate metabolism are discussed in both articles. The other two papers, one by David J.A. Jenkins,[12] Department of Nutrition and Food Science, University of Toronto, Ontario, Canada, and colleagues, and another by Ann M. Coulston and colleagues,[13] Stanford University School of

Medicine, California, focus on the effects that carbohydrate-rich foods have on blood glucose levels.

Among the cited core of #87-0845 is an article by Ann-Sofie Sandberg and colleagues, Department of Clinical Nutrition, Sahlgren's Hospital, Göteborg, Sweden.[14] Published in the *British Journal of Nutrition*, this paper describes a method of determining dietary fiber in wheat bran and the effects of bran on nutrient absorption in the small intestine after digestion in ileostomy patients.

Another area of research attracting attention is the link between nutrition and cancer. Research front #87-1018, "Risk of cancer, plasma selenium, serum carotenoids levels, and leukocyte zinc concentrations," deals specifically with cancer and nutrition. Over 500 papers were published on this topic in 1987. We discussed nutrition and cancer at length in our essay on nutrition research.[3] Further emphasizing the growing interest in this area is the fact that this year we began covering *Nutrition and Cancer*, which is published by Lawrence Erlbaum Associates, Hillsdale, New Jersey, in the *SCI*. Gio B. Gori is the journal's editor. This journal publishes articles of importance to researchers in the field of nutrition and cancer. And, although it is still too early for us to have any accumulated data for this journal since we began covering it in April, it will be interesting to see where it appears in future journal studies.

Research front #87-1406, "High-density lipoprotein and LDL receptor in familial hypercholesterolemia," which appears in Table 1, also deserves mention. Of the 1,205 papers published on this topic in 1987, *only* 45 (3.7 percent) were published in the core nutrition journals. And, of the 39 cited documents in the core of this cluster, *none* were published in any of the journals in Table 2. This is the only front in Table 1 where this is the case.

Most-Cited Articles

Table 3 lists the most-cited articles from each of the core journals for the period 1955-1987. We limited our selection to two articles cited 50 or more times from each journal. The *Ecology of Food and Nutrition* and *Human Nutrition—Clinical Nutrition* each had only one paper that met the 50-citation threshold. The *Journal of Pediatric Gastroenterology and Nutrition*, the *Journal of the American College of Nutrition*, and *Nutrition Research* had no articles above that threshold. But it is important to keep in mind that they haven't been published as long as other journals in this study; the first two were started in 1982 and the latter in 1981.

A number of the papers in Table 3 are among the core of the 1987 research fronts in Table 1. The 1965 article by Hegsted and colleagues, mentioned earlier, is core to #87-1681. The article has received just over 350 citations since it was published. The paper reports on the effects of various types of dietary fats, particularly monounsaturated and polyunsaturated oils, on cholesterol levels in men.

The 1959 article by A.E. Harper, Department of Biochemistry, University of Wisconsin, Madison, is 1 of the 15 cited documents in the core of #87-4839, "Brain 5-hydroxytryptamine metabolism, plasma tryptophan, serotonin levels during glucose tolerance testing, and carbohydrate cravers." Entitled "Amino acid balance and imbalance," the paper describes quantitatively the effect of the dietary level of protein on the severity of amino acid imbalance. This paper has been cited more than 400 times. The 1979 article written by Calvin L. Long and colleagues, Department of Surgery, Medical College of Ohio, Toledo, is a core article in #87-1282, "Total parenteral nutrition in critically ill surgical patients." It reviews the metabolic response, in terms of energy and protein needs, to injury and illness.

While the 1955 article by D.S. Miller and A.E. Bender, Crookes Laboratories, London, UK, in Table 3 is not core to any of the 1987 nutrition fronts despite its high citation levels, a subsequent paper by Miller and P.R. Payne,[15] National Institute for Medical Research, London, is among the 39 cited documents in the core of #87-0763,

"Low birth-weight infants, fortified formula, and high calcium excretion." In this 1959 article, "A ballistic bomb calorimeter," a then new method for determining the caloric value of different foods was outlined. The article has been cited more than 150 times since it was published and continues to be cited today—10 times in 1987.

The 1981 article written by N.J. Rothwell and M.J. Stock, Department of Physiology, St. George's Hospital Medical School, London, reviews the metabolic regulation of energy balance in humans. Other works by Rothwell and Stock, as well as research front #86-1285, were discussed recently in our essay on hibernation.[16]

Citation Classics

Seven of the 52 articles in Table 3 have had *Citation Classic*® commentaries written about them. The subject of one of these commentaries and the most-cited paper on the list was published in the *Journal of Nutrition* in 1966 by Myron Winick and Adele Noble, Institute of Human Nutrition, Columbia University, New York. Cited over 660 times, the paper discusses the effects of malnutrition at the cellular level.

In his 1979 commentary on the paper,[17] Winick acknowledged his debt to a 1962 paper by M. Enesco and C.P. Leblond,[18] Department of Anatomy, McGill University, Montreal, Quebec, Canada. Enesco and Leblond had discussed cell enlargement and proliferation in relation to the growth of organs and tissues.

"I am delighted to learn that this paper is among those most cited by other investigators," Winick stated.

> To me, it represents my most creative single study. It launched all of my subsequent investigations in the area of cellular growth of the brain both in animals and in children. It stimulated my interest in the general problem of early malnutrition in young children and pregnant women, which has ultimately led to broadening my own horizons in the science of human nutrition.[17]

In fact, Winick and Noble had a related work in our study of the literature of developmental biology.[2] That paper, a discussion of the quantitative changes that occur in cellular growth from birth through adulthood,[19] provided some of the groundwork for the work appearing in this study. It has been cited over 455 times and is also the subject of a *Citation Classic* commentary.[20]

Nutrition Research in Noncore Journals

The nutrition articles published in noncore journals that were most cited in 1987 are listed in Table 4. We selected these articles by processing all the references cited in the 1987 editions of the 19 core journals. We then created a "mini-citation index" of the papers cited and ranked these papers by their citation frequency.

The nine papers in Table 4 were cited at least 11 times by the core journals in 1987. Papers from the *British Medical Journal*, the *Journal of Biological Chemistry*, and *Nature* are included. Three of the papers on the list have been the subjects of *Citation Classic* commentaries. The most-cited work in the table is a classic methods paper on protein measurement by Oliver H. Lowry and colleagues, Department of Pharmacology, Washington University School of Medicine, St. Louis, Missouri. It was cited 122 times in the core nutrition journals in 1987. This paper is the all-time super citation classic. It has been cited in more than 176,950 papers since 1955. When we complete the record for the earlier years, this figure will not change much. But our 1945-1954 *SCI* cumulation will demonstrate how quickly it became popular.

Specific Ingredients of the Core Nutrition Journals

The 19 core journals published 2,050 articles in 1986, or 0.33 percent of the 625,400 items covered in the 1986 *SCI*. These articles cited 57,395 references in 1986, or about 0.57 percent of the 10 million references in the *SCI* that year. The average nutrition article in 1986 cited approximately 28 references, compared to the average of about 16 for the entire *SCI*. (Keep

Table 3: The most-cited articles from each core nutrition journal according to the 1955-1987 *SCI®*. Articles are listed in alphabetic order by first author. A = 1955-1987 citations. B = total number of papers from that journal cited at least 50 times. An asterisk (*) indicates that the paper was the subject of a *Citation Classic®* commentary. The issue, year, and edition of *Current Contents®* in which the commentary appeared follow the bibliographic reference. *SCI/SSCI®* research-front numbers for 1986 also follow the reference.

A	Bibliographic Data	B
154	**Abdellatif A M M & Vles R O.** Pathological effects of dietary rapeseed oil in rats. *Nutr. Metab.* 12:285-95, 1970.	9
80	**Adachi T, Tanimura A & Asahina M.** A colorimetric determination of orotic acid. *J. Vitaminol. Jpn.* 9:217-26, 1963. 86-0168	3
224	**Bernhart F W & Tomarelli R M.** A salt mixture supplying the National Research Council estimates of the mineral requirements of the rat. *J. Nutr.* 89:495-500, 1966.	530
410	**Blackburn G L, Bestrian B B, Maini B S, Schlamen H J & Smith M F.** Nutritional and metabolic assessment of the hospitalized patient. *J. Parent. Enter. Nutr.* 1:11-22, 1977.	3
230	**Blaxter K L, Graham N M & Wainman F W.** Some observations on the digestibility of food by sheep, and on related problems. *Brit. J. Nutr.* 10:69-91, 1956. 86-1596	186
132	**Blundell J E.** Is there a role for serotonin (5-hydroxytryptamine) in feeding? *Int. J. Obesity* 1:15-42, 1977.	3
96	**Bollag W.** Vitamin A and vitamin A acid in the prophylaxis and therapy of epithelial tumours. *Int. Z. Vitaminforsch.* 40:299-314, 1970.	4
209	**Brozek J & Keys A.** The evaluation of leanness-fatness in man: norms and interrelationships. *Brit. J. Nutr.* 5:194-206, 1951.	186
201	**Burke B S.** The dietary history as a tool in research. *J. Amer. Diet. Assn.* 23:1041-6, 1947.	24
74	**Chen R W, Eakin D J & Whanger P D.** Biological function of metallothionein. II. Its role in zinc metabolism in the rat. *Nutr. Rep. Int.* 10:195-200, 1974.	7
257	***Chow B F & Lee C-J.** Effect of dietary restriction of pregnant rats on body weight gain of the offspring. *J. Nutr.* 82:10-8, 1964. (34/79/AB&ES)	530
125	**Collins F D, Sinclair A J, Royle J P, Coats D A, Maynard A T & Leonard R F.** Plasma lipids in human linoleic acid deficiency. *Nutr. Metab.* 13:150-67, 1971.	9
214	**Cook J D, Lipschitz D A, Miles L E M & Finch C A.** Serum ferritin as a measure of iron stores in normal subjects. *Amer. J. Clin. Nutr.* 27:681-7, 1974.	415
472	**Crampton E W & Maynard L A.** The relation of cellulose and lignin content to the nutritive value of animal feeds. *J. Nutr.* 15:383-95, 1938. 86-4460	530
334	**Dahl L K.** Salt and hypertension. *Amer. J. Clin. Nutr.* 25:231-44, 1972. 86-1836	415
432	***DeCarli L M & Lieber C S.** Fatty liver in the rat after prolonged intake of ethanol with a nutritionally adequate new liquid diet. *J. Nutr.* 91:331-6, 1967. 86-4691 (13/87/CM,LS)	530
159	**DeLuca H F.** The vitamin D system in the regulation of calcium and phosphorus metabolism. *Nutr. Rev.* 37:161-93, 1979.	13
488	**Durnin J V G A & Rahaman M M.** The assessment of the amount of fat in the human body from measurements of skinfold thickness. *Brit. J. Nutr.* 21:681-9, 1967.	186
563	**Durnin J V G A & Womersley J.** Body fat assessed from total body density and its estimation from skinfold thickness: measurements on 481 men and women aged from 16 to 72 years. *Brit. J. Nutr.* 32:77-97, 1974. 86-2164	186
273	**Edwards D A W, Hammond W H, Healy M J R, Tanner J M & Whitehouse R H.** Design and accuracy of calipers for measuring subcutaneous tissue thickness. *Brit. J. Nutr.* 9:133-43, 1955. 86-0615	186
213	**Farquhar J W, Insull W, Rosen P, Stoffel W & Ahrens E H.** The analysis of fatty acid mixtures by gas-liquid chromatography: construction and operation of an ionization chamber instrument. *Nutr. Rev.* 17(Supp.):1-30, 1959.	13
234	**Frisancho A R.** Triceps skin fold and upper arm muscle size norms for assessment of nutritional status. *Amer. J. Clin. Nutr.* 27:1052-8, 1974.	415
143	**Glatzle D, Korner W F, Christeller S & Wiss O.** Method for the detection of a biochemical riboflavin deficiency. Stimulation of $NADPH_2$-dependent glutathione reductase from human erythrocytes by FAD *in vitro*. Investigations on the vitamin B2 status in healthy people and geriatric patients. *Int. Z. Vitaminforsch.* 40:166-83, 1970. 86-5948	4
81	**Gleibermann L.** Blood pressure and dietary salt in human populations. *Ecol. Food Nutr.* 2:143-56, 1973. 86-5953	1
254	**Hafeman D G, Sunde R A & Hoekstra W G.** Effect of dietary selenium on erythrocyte and liver glutathione peroxidase in the rat. *J. Nutr.* 104:580-7, 1974. 86-0537	530
407	**Harper A E.** Amino acid balance and imbalance. 1. Dietary level of protein and amino acid imbalance. *J. Nutr.* 68:405-18, 1959. 86-1081	530
357	**Hegsted D M, McGandy R B, Myers M L & Stare F J.** Quantitative effects of dietary fat on serum cholesterol in man. *Amer. J. Clin. Nutr.* 17:281-95, 1965. 86-2071	415
384	**Hill F W & Anderson D L.** Comparison of metabolizable energy and productive energy determinations with growing chicks. *J. Nutr.* 64:587-603, 1958. 86-6561	530

A	Bibliographic Data	B
350	*Hirsch J, Farquhar J W, Ahrens E H, Peterson M L & Stoffel W. Studies of adipose tissue in man. A microtechnic for sampling and analysis. *Amer. J. Clin. Nutr.* 8:499-511, 1960. 86-1678 (15/79/AB&ES)	415
351	*Holman R T. The ratio of trienoic:tetraenoic acids in tissue lipids as a measure of essential fatty acid requirement. *J. Nutr.* 70:405-10, 1960. (13/81/AB&ES)	530
452	Hubbel R B, Mendel L B & Wakeman A J. A new salt mixture for use in experimental diets. *J. Nutr.* 14:273-85, 1937. 86-3966	530
208	Johnson M L, Burke B S & Mayer J. Relative importance of inactivity and overeating in the energy balance of obese high school girls. *Amer. J. Clin. Nutr.* 4:37-44, 1956.	415
352	Jones J H & Foster C. A salt mixture for use with basal diets either low or high in phosphorus. *J. Nutr.* 24:245-56, 1942.	530
77	Krotkiewski M, Sjostrom L, Bjorntorp P, Carlgren G, Garellick G & Smith U. Adipose tissue cellularity in relation to prognosis for weight reduction. *Int. J. Obesity* 1:395-416, 1977.	3
113	Long C L, Schaffel N, Geiger J W, Schiller W R & Blakemore W S. Metabolic response to injury and illness: estimation of energy and protein needs from indirect calorimetry and nitrogen balance. *J. Parent. Enter. Nutr.* 3:452-6, 1979. 86-1262	3
262	McCay C M, Crowell M F & Maynard L A. The effect of retarded growth upon the length of life span and upon the ultimate body size. *J. Nutr.* 10:63-79, 1935. 86-4633	530
381	*Miller D S & Bender A E. The determination of the net utilization of proteins by a shortened method. *Brit. J. Nutr.* 9:382-8, 1955. (8/79/AB&ES)	186
370	Neeld J B & Pearson W N. Macro- and micromethods for the determination of serum vitamin A using trifluoroacetic acid. *J. Nutr.* 79:454-62, 1963. 86-1318	530
96	Neilands J B. Iron absorption and transport in microorganisms. *Annu. Rev. Nutr.* 1:27-46, 1981.	2
159	Oser B L. Method for integrating essential amino acid content in the nutritional evaluation of protein. *J. Amer. Diet. Assn.* 27:396-402, 1951.	24
153	Reinhold J G, Ismail-Beigi F & Faradji B. Fibre vs. phytate as determinant of the availability of calcium, zinc and iron of breadstuffs. *Nutr. Rep. Int.* 12:75-85, 1975.	7
479	Rogers Q R & Harper A E. Amino acid diets and maximal growth in rats. *J. Nutr.* 87:267-73, 1965. 86-6365	530
89	Rothwell N J & Stock M J. Regulation of energy balance. *Annu. Rev. Nutr.* 1:235-56, 1981. 86-1285	2
209	Sandstead H H, Prasad A S, Schulert A R, Farid Z, Miale A, Bassily S & Darby W J. Human zinc deficiency, endocrine manifestations and response to treatment. *Amer. J. Clin. Nutr.* 20:422-42, 1967.	415
242	Sandstead H H. Zinc nutrition in the United States. *Amer. J. Clin. Nutr.* 26:1251-60, 1973.	415
125	Southgate D A T, Bailey B, Collinson E & Walker A F. A guide to calculating intakes of dietary fibre. *J. Hum. Nutr.* 30:303-13, 1976. 86-8034	1
273	Suda T, DeLuca H F & Tanaka Y. Biological activity of 25-hydroxyergocalciferol in rats. *J. Nutr.* 100:1049-52, 1970.	530
241	*Trowell H C. Ischemic heart disease and dietary fiber. *Amer. J. Clin. Nutr.* 25:926-32, 1972. (3/81/CP)	415
122	Van Soest P J & McQueen R W. The chemistry and estimation of fibre. *Proc. Nutr. Soc.—Engl. Scot.* 32:123-30, 1973.	20
60	Wada H, Morisue T, Sakamoto Y & Ichihara K. Quantitative determination of pyridoxal-phosphate by apotryptophanase of *Escherichia coli*. *J. Vitaminol. Jpn.* 3:183-8, 1957.	3
107	Widdowson E M, Dauncey J & Shaw J C L. Trace elements in foetal and early postnatal development. *Proc. Nutr. Soc.—Engl. Scot.* 33:275-84, 1974.	20
666	*Winick M & Noble A. Cellular response in rats during malnutrition at various ages. *J. Nutr.* 89:300-6, 1966. 86-5249 (9/79/AB&ES)	530

in mind that the *SCI* indexes a number of items that normally contain few or no references, such as letters and editorials.)

The *Journal of the American Dietetic Association*, founded in 1925, is the oldest journal on the core list, followed by the *Journal of Nutrition* in 1928 and the *International Journal for Vitamin and Nutrition Research* in 1932. Core journals founded during or immediately following World War II include *Nutrition Reviews* (1942); the *Proceedings of the Nutrition Society* (1944); as well as the *Annals of Nutrition and Metabolism*, the *British Journal of Nutrition*, and *Human Nutrition—Clinical Nutrition*, all founded in 1947.

US publishers account for 11 of the 19 core journals on the list, including the 2 oldest. Five of the 19 journals are published in the UK, two in Switzerland, and one in Ja-

Table 4: Highly cited articles published in noncore journals cited at least 11 times by core nutrition journals in the 1987 *SCI®*. Articles are listed in alphabetic order by first author. A = 1987 citations from core journals. B = total 1955-1986 *SCI* citations. An asterisk (*) indicates that the paper was the subject of a *Citation Classic®* commentary. The issue and year of *Current Contents®* in which the commentary appeared follow the bibliographic reference. *SCI/SSCI®* research-front numbers for 1986 also follow the reference.

A	B	Bibliographic Data
18	1,289	**Allain C C, Poon L S, Chan C S G, Richmond W & Fu P C.** Enzymatic determination of total serum cholesterol. *Clin. Chem.* 20:470-5, 1974. 86-0553
16	8,705	***Bligh E G & Dyer W J.** A rapid method of total lipid extraction and purification. *Can. J. Biochem. Physiol.* 37:911-7, 1959. (52/78)
13	19,460	**Bradford M M.** A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding. *Anal. Biochem.* 72:248-54, 1976.
26	8,392	***Duncan D B.** Multiple range and multiple *F* tests. *Biometrics* 11:1-42, 1955. (4/77)
17	15,363	**Fiske C H & Subbarow Y.** The colorimetric determination of phosphorus. *J. Biol. Chem.* 66:375-400, 1925.
11	309	**Jenkins D J A, Wolever T M S, Leeds A R, Gassull M A, Haisman P, Dilawari J, Goff D V, Metz G L & Alberti K G M M.** Dietary fibres, fibre analogues, and glucose tolerance: importance of viscosity. *Brit. Med. J.* 1:1392-4, 1978. 86-0863
11	49,235	**Laemmli U K.** Cleavage of structural proteins during the assembly of the head of bacteriophage T4. *Nature* 227:680-5, 1970.
122	176,954	***Lowry O H, Rosebrough N J, Farr A L & Randall R J.** Protein measurement with the Folin phenol reagent. *J. Biol. Chem.* 193:265-75, 1951. (1/77)
13	330	**Weir J B de V.** New methods for calculating metabolic rate with special reference to protein metabolism. *J. Physiol.* 109:1-9, 1949.

pan. All of the core journals publish articles in English; the *Annals of Nutrition and Metabolism* also publishes in French, and the *International Journal for Vitamin and Nutrition Research* publishes articles in both French and German.

The Journals Citing and Cited by the Core

We treated the 19 core journals as if they were a single "macrojournal" of nutrition research and ranked the journals that cite it and those that are cited by it. The 50 journals most frequently cited by the core comprise Table 5. Nine of the 19 core journals appear in the table. Table 6 breaks down the citation information for the top 50 of the 1,352 journals that cited the core group in 1986. Although these 50 journals represent just 3.7 percent of the citing journals, the number of citations they gave to the core group (17,000) accounts for 52.7 percent of all the 1986 citations received. All 19 core journals are on the list.

The 31 noncore journals on the list gave out approximately 335,500 citations; 5,770 (1.7 percent) were to the nutrition core. In contrast, of the core journals' 57,400 citations, 10,900 (about 19 percent) were to other core journals.

Comparing the data from Tables 5 and 6, the same three core journals appear in the top five of each list: the *Journal of Nutrition*, the *American Journal of Clinical Nutrition*, and the *British Journal of Nutrition*. The *Journal of Nutrition* and the *American Journal of Clinical Nutrition* are the top two on both lists, but they flip-flop in their positions: in Table 5 (the journals most cited by the core) the *American Journal of Clinical Nutrition* is first and the *Journal of Nutrition*, second; in Table 6 (the journals that most frequently cite the core) the journals reverse positions. The *British Journal of Nutrition* ranks fifth on the list in Table 5 but is fourth in Table 6. These three journals thus rank the highest both in terms of their citations to the core nutrition journals and their citations from the core.

These three journals also rank high in terms of the number of source items they published. The *Journal of Nutrition* is first, with 263 items, and the *American Journal of Clinical Nutrition* is third, with 224 items. Interestingly, the *British Journal of Nutrition* ranked ninth among core journals, with just 129 source items. The *American Jour-*

Table 5: The journals most cited by the core nutrition journals in the 1986 *SCI*®. Asterisks (*) indicate core journals. A=citations from core journals. B=citations from all journals. C=self-citations. D=percent of total citations that are core-journal citations (A/B). E=percent of total citations that are self-citations (self-cited rate, C/B). F=percent of core-journal citations that are self-citations (C/A). G=1986 impact factor. H=1986 immediacy index. I=1986 source items.

	A	B	C	D	E	F	G	H	I
*Amer. J. Clin. Nutr.	3,415	9,933	881	34.4	8.9	25.8	2.55	0.46	224
*J. Nutr.	2,862	8,018	1,151	35.7	14.4	40.2	1.71	0.34	263
J. Biol. Chem.	1,487	158,553	—	0.9	—	—	6.32	1.20	2,638
Lancet	1,168	65,734	—	1.8	—	—	12.86	4.31	491
*Brit. J. Nutr.	1,155	3,776	422	30.6	11.2	36.5	1.74	0.40	129
Amer. J. Physiol.	825	45,829	—	1.8	—	—	3.29	0.54	1,638
*J. Amer. Diet. Assn.	803	1,454	521	55.2	35.8	64.9	0.77	0.23	163
N. Engl. J. Med.	784	64,636	—	1.2	—	—	17.75	4.08	367
J. Clin. Invest.	783	42,808	—	1.8	—	—	6.74	0.96	503
Biochem. J.	687	42,827	—	1.6	—	—	4.23	1.04	1,002
Gastroenterology	672	23,295	—	2.9	—	—	6.40	1.08	375
J. Pediat.	667	15,768	—	4.2	—	—	2.83	0.41	408
Biochim. Biophys. Acta	643	71,102	—	0.9	—	—	2.74	0.46	2,079
J. Anim. Sci.	504	8,352	—	6.0	—	—	1.33	0.35	413
Metabolism	495	5,629	—	8.8	—	—	1.72	0.29	215
Fed. Proc.	482	16,625	—	2.9	—	—	0.34	0.07	8,769
J. Lipid Res.	470	7,824	—	6.0	—	—	3.29	0.73	143
Pediatrics	456	12,619	—	3.6	—	—	2.69	0.54	293
Science	455	91,449	—	0.5	—	—	12.44	3.00	803
*Nutr. Rep. Int.	452	1,124	155	40.2	13.8	34.3	0.35	0.07	246
Brit. Med. J.	416	32,473	—	1.3	—	—	2.49	2.05	899
Proc. Soc. Exp. Biol. Med.	405	11,332	—	3.6	—	—	1.59	0.29	242
Poultry Sci.	382	4,618	—	8.3	—	—	0.72	0.14	349
*J. Parent. Enter. Nutr.	366	1,320	218	27.7	16.5	59.6	1.85	0.15	132
JAMA—J. Am. Med. Assn.	345	26,837	—	1.3	—	—	3.91	1.66	504
Nature	331	147,048	—	0.2	—	—	15.25	3.26	1,165
*Proc. Nutr. Soc.—Engl. Scot.	319	1,088	56	29.3	5.2	17.6	1.87	0.58	40
Proc. Nat. Acad. Sci. USA	314	143,060	—	0.2	—	—	9.17	1.52	2,043
Arch. Biochem. Biophys.	294	19,108	—	1.5	—	—	2.24	0.74	605
Pediat. Res.	291	5,886	—	4.9	—	—	3.00	0.48	249
Clin. Chem.	287	11,860	—	2.4	—	—	2.68	0.48	585
J. Dairy Sci.	268	6,817	—	3.9	—	—	1.31	0.22	377
Diabetes	266	10,332	—	2.6	—	—	4.39	0.67	228
Biochem. Biophys. Res. Commun.	262	39,294	—	0.7	—	—	3.79	0.63	1,442
Clin. Chim. Acta	259	8,269	—	3.1	—	—	1.35	0.31	280
J. Lab. Clin. Med.	254	9,439	—	2.7	—	—	1.90	0.29	161
Ann. Surg.	253	11,977	—	2.1	—	—	2.89	0.26	194
Arch. Dis. Child.	250	5,575	—	4.5	—	—	1.57	0.35	276
Clin. Sci.	244	8,172	—	3.0	—	—	3.03	0.56	206
Anal. Biochem.	243	30,003	—	0.8	—	—	2.46	0.72	530
Lipids	243	3,810	—	6.4	—	—	1.64	0.33	151
J. Clin. Endocrinol. Metab.	235	20,848	—	1.1	—	—	4.20	0.50	448
Acta Paediat. Scand.	219	3,118	—	7.0	—	—	1.03	0.18	216
Cancer Res.	219	36,795	—	0.6	—	—	4.06	0.61	1,110
Atherosclerosis	216	3,234	—	6.7	—	—	1.69	0.30	133
Amer. J. Dis. Child.	214	6,011	—	3.6	—	—	1.67	0.50	211
Ann. Intern. Med.	208	24,713	—	0.8	—	—	8.70	1.89	277
*J. Pediat. Gastroenterol. Nutr.	200	699	148	28.6	21.2	74.0	1.25	0.20	169
*Nutr. Rev.	199	609	57	32.7	9.4	28.6	0.63	0.21	137
Gut	198	8,287	—	2.4	—	—	4.13	0.82	233

Table 6: The 50 journals that most frequently cited the core nutrition journals in the 1986 *SCI®*. Asterisks (*) indicate core journals. A = citations to core journals. B = citations to all journals. C = self-citations. D = percent of total citations that are core-journal citations (A/B). E = percent of total citations that are self-citations (self-cited rate, C/B). F = percent of core-journal citations that are self-citations (C/A). G = 1986 impact factor. H = 1986 immediacy index. I = 1986 source items.

	A	B	C	D	E	F	G	H	I
*J. Nutr.	2,166	9,673	1,151	22.4	11.9	53.1	1.71	0.34	263
*Amer. J. Clin. Nutr.	1,504	6,935	881	21.7	12.7	58.6	2.55	0.46	224
*J. Amer. Diet. Assn.	946	3,921	521	24.1	13.3	55.1	0.77	0.23	163
*Brit. J. Nutr.	875	3,610	422	24.2	11.7	48.2	1.74	0.40	129
*Nutr. Rep. Int.	832	4,311	155	19.3	3.6	18.6	0.35	0.07	246
*Nutr. Res.	778	3,452	41	22.5	1.2	5.3	0.73	0.14	140
*J. Parent. Enter. Nutr.	486	3,072	218	15.8	7.1	44.9	1.85	0.15	132
J. Anim. Sci.	468	11,663	—	4.0	—	—	1.33	0.35	413
*J. Pediat. Gastroenterol. Nutr.	396	4,282	148	9.3	3.5	37.4	1.25	0.20	169
Amer. J. Physiol.	381	49,677	—	0.8	—	—	3.29	0.54	1,638
*J. Amer. Coll. Nutr.	380	2,158	23	17.6	1.1	6.1	1.76	0.10	50
*Annu. Rev. Nutr.	355	3,279	21	10.8	0.6	5.9	4.28	0.38	24
*Nutr. Rev.	341	2,735	57	12.5	2.1	16.7	0.63	0.21	137
J. Dairy Sci.	310	8,763	—	3.5	—	—	1.31	0.22	377
*J. Nutr. Sci. Vitaminol.	303	1,378	61	22.0	4.4	20.1	0.52	0.14	65
Arch. Tierernahr.	290	1,893	—	15.3	—	—	0.68	0.19	84
*Proc. Nutr. Soc.—Engl. Scot.	290	1,627	56	17.8	3.4	19.3	1.87	0.58	40
*Int. J. Vitam. Nutr. Res.	249	1,054	59	23.6	5.6	23.7	0.72	0.13	68
*Prog. Food Nutr. Sci.	241	1,299	2	18.6	0.2	0.8	1.47	0.00	5
Physiol. Behav.	239	12,779	—	1.9	—	—	1.43	0.30	478
Biol. Tr. Elem. Res.	220	1,601	—	13.7	—	—	1.02	0.30	57
*Hum. Nutr.—Clin. Nutr.	220	1,277	41	17.2	3.2	18.6	1.13	0.30	53
Poultry Sci.	218	6,045	—	3.6	—	—	0.72	0.14	349
*Ann. Nutr. Metab.	215	1,268	22	17.0	1.7	10.2	1.20	0.25	52
Reprod. Nutr. Develop.	214	4,078	—	5.3	—	—	0.82	0.47	93
*Int. J. Obesity	205	1,377	66	14.9	4.8	32.2	0.99	0.13	53
J. Food Sci.	197	8,181	—	2.4	—	—	0.82	0.15	436
Comp. Biochem. Physiol. Pt. A	190	10,190	—	1.9	—	—	0.78	0.16	379
Food Technol.	187	3,694	—	5.1	—	—	1.05	0.27	117
Amer. J. Gastroenterol.	175	5,892	—	3.0	—	—	1.03	0.11	232
Proc. Soc. Exp. Biol. Med.	172	6,134	—	2.8	—	—	1.59	0.29	242
Biochim. Biophys. Acta	164	66,751	—	0.3	—	—	2.74	0.46	2,079
Metabolism	163	6,963	—	2.3	—	—	1.72	0.29	215
Surg. Clin. N. Amer.	161	3,672	—	4.4	—	—	0.60	0.03	87
Lancet	153	22,559	—	0.7	—	—	12.86	4.31	491
Fed. Proc.	152	8,119	—	1.9	—	—	0.34	0.07	8,769
Gut	150	6,681	—	2.3	—	—	4.13	0.82	233
Pediat. Res.	150	7,191	—	2.1	—	—	3.00	0.48	249
ACS Symp. Ser.	146	20,922	—	0.7	—	—	0.72	0.21	740
*Ecol. Food Nutr.	142	687	41	20.7	6.0	28.9	0.44	0.19	37
Curr. Opin. Gastroen.	136	1,490	—	9.1	—	—	0.07	0.00	118
Agr. Biol. Chem.—Tokyo	133	8,779	—	1.5	—	—	0.91	0.31	579
Lipids	132	4,192	—	3.2	—	—	1.64	0.33	151
J. Pediat.	130	9,251	—	1.4	—	—	2.83	0.41	408
Anim. Feed Sci. Tech.	128	1,587	—	8.1	—	—	0.76	0.17	76
Acta Paediat. Scand.	125	4,246	—	2.9	—	—	1.03	0.18	216
Pediatrics	125	7,543	—	1.7	—	—	2.69	0.54	293
Gastroenterology	124	12,750	—	1.0	—	—	6.40	1.08	375
J. Agr. Food Chem.	120	5,495	—	2.2	—	—	1.27	0.53	266
Digest. Dis. Sci.	118	6,733	—	1.8	—	—	2.40	0.40	236

nal of Clinical Nutrition and the *Journal of Nutrition* are also first and second, respectively, in terms of the number of citations they received in 1986. In this respect, however, the *British Journal of Nutrition* occupies a more expected rank—it is third, with 3,776. However, it should be noted that this figure represents a large drop from the number of citations the *American Journal of Clinical Nutrition* and the *Journal of Nutrition* received (9,933 and 8,018, respectively).

Impact

The *Annual Review of Nutrition* has the highest 1986 impact factor among core nutrition journals—4.28. The *American Journal of Clinical Nutrition* is next, with an impact of 2.55. The *British Journal of Nutrition* (1.74) and the *Journal of Nutrition* (1.71), which figured prominently in our comparison of Tables 5 and 6, are among a group of core journals are clustered within 0.16 of one another in terms of impact, and are above the core average of 1.37. The group includes the *Proceedings of the Nutrition Society* (1.87), the *Journal of Parenteral and Enteral Nutrition* (1.85), and the *Journal of the American College of Nutrition* (1.76).

In Table 7 we provide the 1986 *JCR* impact factors for a selection of eight core journals, using five different two-year bases. No unusual patterns emerge; 1983-1984 is the base period in which most of the selected journals peak, indicating that nutrition is a relatively fast-moving field. But a few anomalies deserve mention. For instance, the impact for the *American Journal of Clinical Nutrition* remains the same when the years 1983-1984 and 1982-1983 are used as bases to calculate the figure. However, the articles published by *Progress in Food and Nutrition Science* peak immediately (in 1984-1985), while those published in the *Journal of Parenteral and Enteral Nutrition* and the *Annual Review of Nutrition* peak in 1980-1981.

Half-Life Data

While a journal's impact gives an indication of its centrality to the literature, its half-life data indicate the speed with which a field moves. Cit*ing* half-life indicates the median age of the literature a journal cites, while cit*ed* half-life indicates how long its own material is cited. Specifically, "half-life" is the median age of a journal's cit*ed* or cit*ing* literature. Table 8 lists the 1986 cited and citing half-lives for all 19 core nutrition journals.

The cit*ed* half-life is the median age of the articles from a journal that were cited in 1986. The average 1986 cited half-life of nutrition journals is 5.3 years, meaning that, on average, half of the 1986 citations to core nutrition journals were to articles they published over the past 5 years or so. It also shows that nutrition research moves somewhat faster than the average, since the average cited half-life for all journals covered in the 1986 *SCI* is 6.8. The *Journal of the American College of Nutrition* has the shortest cited half-life in Table 8, at 2.5 years, and the *Journal of Nutrition*, the longest (9.4). However, it must be pointed out that

Table 7: Core-journal impact factors. The 1986 *JCR*® impact factors of core journals using different two-year bases. Journals are listed in alphabetic order. A=1984-1985. B=1983-1984. C=1982-1983. D=1981-1982. E=1980-1981.

	A	B	C	D	E
Amer. J. Clin. Nutr.	2.55	3.40	3.40	3.00	2.77
Ann. Nutr. Metab.	1.20	1.24	1.03	0.91	0.78
Annu. Rev. Nutr.	4.28	4.72	3.94	4.47	5.11
Brit. J. Nutr.	1.74	2.40	2.22	2.22	1.99
J. Nutr.	1.71	2.02	1.92	1.71	1.76
J. Parent. Enter. Nutr.	1.85	1.92	1.79	1.99	2.10
Proc. Nutr. Soc.—Engl. Scot.	1.87	2.60	2.23	1.91	1.82
Prog. Food Nutr. Sci.	1.47	1.23	0.47	0.76	0.71

Table 8: Half-lives. The 1986 *SCI*® cit*ed* and cit*ing* half-lives of core nutrition journals. Journals are listed in alphabetic order. A=cit*ed* half-life. B=cit*ing* half-life.

	A	B
Amer. J. Clin. Nutr.	6.6	7.4
Ann. Nutr. Metab.	3.2	7.7
Annu. Rev. Nutr.	3.3	6.3
Brit. J. Nutr.	8.6	8.6
Ecol. Food Nutr.	6.5	7.9
Hum. Nutr.—Clin. Nutr.	2.9	8.4
Int. J. Obesity	4.7	7.0
Int. J. Vitam. Nutr. Res.	6.5	8.3
J. Amer. Coll. Nutr.	2.5	7.4
J. Amer. Diet. Assn.	6.9	6.0
J. Nutr.	9.4	8.1
J. Nutr. Sci. Vitaminol.	5.9	9.1
J. Parent. Enter. Nutr.	4.4	7.4
J. Pediat. Gastroenterol. Nutr.	2.7	7.3
Nutr. Rep. Int.	5.5	9.2
Nutr. Res.	3.1	7.8
Nutr. Rev.	5.2	6.4
Proc. Nutr. Soc.—Engl. Scot.	7.1	6.4
Prog. Food Nutr. Sci.	5.0	8.5

the *Journal of the American College of Nutrition* is just six years old, while the *Journal of Nutrition* is 10 times that age. Thus, the *Journal of the American College of Nutrition* simply hasn't been around long enough to be fairly compared to other core journals.

Cit*ing* half-life is the median age of the literature cited by a journal and gives an indication of the age of the literature that each journal cites. The average 1986 citing half-life of core nutrition journals is 7.6 years; the average for the entire *SCI* is, once again, 6.8. Thus, the literature cited by nutrition journals is slightly older than average. The *Journal of the American Dietetic Association* has the shortest citing half-life—6.0 years—and *Nutrition Reports International* has the longest—9.2. The *Journal of Nutritional Science and Vitaminology*, however, has a citing half-life of 9.1 years.

The immediacy index (column H in Tables 5 and 6) measures how quickly the material of a field is used. Immediacy indicates how often a journal's articles were cited in the same year in which they were published. The *Proceedings of the Nutrition Society* ranks first among the core journals, with a 1986 immediacy index of 0.58. The *American Journal of Clinical Nutrition* and the *British Journal of Nutrition* were close, with immediacy indexes of 0.46 and 0.40, respectively, followed by the *Journal of Nutrition*, at 0.34.

Conclusion

All of the journals in this study are important means of communication among nutrition researchers. Our data suggest the key roles played by the *American Journal of Clinical Nutrition*, the *British Journal of Nutrition*, and the *Journal of Nutrition*. But, as we've indicated in the beginning of this essay, several additional factors may influence the results somewhat. As in all specialties, nutrition researchers also rely on large, multidisciplinary journals, such as *Science* and *Nature*, and on journals of general medicine, such as the *New England Journal of Medicine*, *Lancet*, and the *Journal of Clinical Investigation*. They also use the somewhat more specialized journals of larger, neighboring fields, such as the *Journal of Biological Chemistry* and *Cell*.

Cohen, mentioned previously, summed up the current picture of nutrition research when he stated,

> The field of nutrition has expanded beyond its old confines (that is, vitamin deficiency diseases, energy budgets, metabolism and catabolism of nutrients) and entered the larger world of chronic diseases (heart disease, cancer, arthritis) and aging. Epidemiologists, experimental biologists, and a few clinicians, not necessarily trained by the classical nutritionists, are leading the way and, in a sense, are dragging the "old guard" along (largely against their will) into this strange new world.[9]

* * * * *

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