

cereal bran, that the authors do not specifically recommend an increase in whole grain and cereal consumption. They acknowledge, however, that to concur with other guidelines, e.g. in regard to decreasing fat consumption, will require more calories to be obtained from this source.

Cereals have been inversely related to large bowel cancer risk in ecological studies yet several case-control studies have found an increased risk with the consumption of rice and pasta [4-7]. A possible explanation for this anomaly might be that at the population level cereals are inversely related to energy availability, but within a population the consumption of cereal staples is positively related to energy intake. Energy intake has generally not been measured in the case-control studies mentioned above so it has not been possible to control for its effect. The case-control study of Iscovich and colleagues [8] is particularly noteworthy in this regard because of the finding that carbohydrate was the most important factor driving the adverse effect of total energy intake. There is a view that the macronutrient composition of the diet should be modified to increase complex carbohydrates at the expense of fat. Mindful of the ethical considerations that are so well expressed in the manuscript, it would seem that we are not quite yet in a position to offer this advice to the public. Bingham [9] has shown that the effect of starch has seldom been reported in studies of colorectal cancer in humans. Future studies should report the effects of oligosaccharides, starch, non-starch polysaccharides and energy. If dietary "fibre" is to be reported at all, the source of the fibre needs to be stated clearly, as does the method of fibre analysis. Our ignorance is profound, and each incremental gain in knowledge forces us to revise previously held beliefs. The point is well made about the changing behaviour of potato starch which acts physiologically like "fibre" when eaten cold. If this is the case, diet diaries and questionnaires will need to specify this in future studies, particularly where potatoes are a staple food.

There are obviously many difficulties in researching the effects

of dietary "fibre" on cancer risk and, therefore, in knowing what to recommend in dietary guidelines. There is little to suggest, however, that people pay much attention to official guidelines, relying more for information on the food industry and other media propaganda. It would be a shame to see the widespread commercial fortification of food supplies with today's popular dietary icons. Ultimately, people eat foods not "fibre", and dietary guidelines should reflect and promote cuisine rather than quasi-pharmaceutical nutrients and non-nutritive substances. To this end, the authors have achieved a reasonable compromise. We join in their plea for better databases, better methodology and better studies.

1. Steinmetz K, Potter J. Vegetables, fruit and cancer. I. Epidemiology. *Cancer Causes and Control* 1991a, 2, 325-357.
2. Steinmetz K, Potter J. Vegetables, fruit and cancer. II. Mechanisms. *Cancer Causes and Control* 1991b, 2, 427-442.
3. Jensen OM. Dietary fibre, carbohydrate and cancer: epidemiologic evidence. In Miller AB, ed. *Diet and the Aetiology of Cancer*. European School of Oncology Monographs. Heidelberg, Springer-Verlag, 1989.
4. Macquart-Moulin G, Riboli E, Cornee J, et al. Case-control study on colorectal cancer and diet in Marseilles. *Int J Cancer* 1986, 38, 183-191.
5. La Vecchia C, Decarli A, Negri E, et al. A case-control study of diet and colo-rectal cancer in northern Italy. *Int J Cancer* 1988, 41, 492-498.
6. Tuyns AJ, Kaaks R, Haelterman M. Colorectal cancer and the consumption of foods: a case-control study in Belgium. *Nutr Cancer*, 1988, 11, 189-204.
7. Benito E, Obrador A, Stiggebout A, et al. A population-based case-control study of colorectal cancer in Majorca. *Int J Cancer* 1990, 49, 161-167.
8. Iscovich JML, Abbe KA, Costellato R, et al. Colon cancer in Argentina. II. Risk from fibre, fat and nutrients. *Int J Cancer*, 1992, 51, 858-861.
9. Bingham SA. Mechanisms and experimental and epidemiological evidence relating dietary fibre (non-starch polysaccharides) and starch to protection against large bowel cancer. *Proc Nutr Soc* 1990, 49, 153-171.

European Journal of Cancer Vol. 30A, No. 2, pp. 227-228, 1994
Copyright © 1994 Elsevier Science Ltd
Printed in Great Britain. All rights reserved
0959-8049/94 \$6.00 + 0.00

0959-8049(93)E0022-I

S. Franceschi

THE STATEMENT of Doll and Peto 1981 [1], according to which "diet is a chronic source of both frustration and excitement to epidemiologists" [1], still holds true, although data accrual and methodological advancements in nutritional epidemiology in the last decade are probably unrivalled by any other field [2]. The article by Miller and co-authors in the present issue of *European Journal of Cancer* (pp. 207-220) is a vast, though obviously not complete, overview of the present state of the art. Some issues (e.g. cancer of the breast and colon-rectum) and some approaches (e.g. case-control studies) have received more attention than others.

The tendency, for instance, to discuss separately macronutrients and a few micronutrients is very strong, and reflects the way nutritional data are routinely collected (generally by means of frequency questionnaires), analysed and published. This somewhat fragmentary approach has been partly attenuated by the present awareness of the implications of total energy intake [2], but can make us miss some potentially important aspects of eating patterns (e.g. the number and timing of meals during the day).

The variety of our daily sources of calories may also be an important aspect of a healthy eating pattern which has been generally overlooked. From an evolutionary view point, pre-neolithic hunter-gatherers were surprisingly good at choosing a balanced diet where no single food (mostly of vegetarian origin) provided more than a few per cent of daily energy

Correspondence to S. Franceschi at the Epidemiology Unit, Aviano Cancer Centre, Via Pedemontana, Occ. le 12, 33081, Aviano (PN), Italy. Received 4 Aug. 1993; accepted 27 Sep. 1993.

requirement [3]. Diet became less perfect, albeit more abundant and reliable, with agriculturalists, who started deriving the vast majority of energy requirements from very few, often only one, local crop. Only in the last three or four decades has affluence again allowed, and to a minority of human beings only, a varied diet all the year long.

Establishing the degree of variety in the diet of individuals and populations is not an easy task, yet it may explain, also in modern times, some associations between certain food items and cancer risk, and also a few apparent discrepancies. The risk of oesophageal cancer, for instance, besides there being a consistent negative association with intake of fresh fruit and vegetables, has showed positive associations with some foods which account, in various areas, for a substantial proportion of caloric intake (e.g. bacon and sausages in American blacks [4], potatoes in northern France [5], maize in some areas of Italy [6], Africa [7] and China [8], and even barbecued meat in Uruguay [9]). It is conceivable that these different staple foods are indicators of monotonous diets aggravated, in patients with oesophageal cancer, by the contemporary consumption of large amounts of "empty calories" from alcohol-containing beverages. Lack of variety in major sources of energy can, therefore, contribute together with alcohol to lowering the habitual intake of known or still unknown protective micronutrients. The interest in the "diversity" of human diet is probably more than a fashion, and deserves some methodological re-thinking and reassessment in present and past data sets.

From a public health viewpoint, I think that some recommendations, particularly the decrease of fat intake, could be a little bolder than in the overview of Miller and co-authors. I do not know, for instance, of any Mediterranean country where major increases in the consumption of saturated fat (including palm and coconut oils) are not occurring. So why bother to give selective recommendations?

If anything, the consumers from southern Europe, where the requirements in food labelling are far less strict than in North

America and northern European countries, deserve special warnings. Demand for lean meat and low fat dairy products is growing everywhere. Because the surplus fat is relatively cheap, very often this is then recycled into other products where its presence is "hidden". Not many are aware, for instance, that some breads contain up to 5% of fat and baked products up to 25%, chiefly saturated fatty acids. No surprise that, in order to lower substantially one's cholesterol and lose some weight too, one must be sealed in Biosphere 2 (36% mean reduction in total serum cholesterol in 6 months) [10].

1. Doll R, Peto R. *The Cause of Cancer. Quantitative Estimates of Avoidable Risks of Cancer in the United States Today*. Oxford, Oxford University Press, 1981.
2. Willett W. *Nutritional Epidemiology*. Oxford, Oxford University Press, 1990.
3. Dunbar R. Foraging for nature's balanced diet. *New Scientist* 1991, 31 Aug, 25-28.
4. Ziegler RG, Morris LE, Blot WJ, Pottern LM, Hoover R. Esophageal cancer among black men in Washington, DC II. Role of nutrition. *JNCI* 1981, **67**, 1199-1206.
5. Tuyns AJ, Ribli E, Doornbos G, Péquignot G. Diet and esophageal cancer in Calvados (France). *Nutr Cancer* 1987, **9**, 81-92.
6. Franceschi S, Bidoli E, Barón AE, La Vecchia C. Maize and risk of cancers of the oral cavity, pharynx, and esophagus in northeastern Italy. *JNCI* 1990, **82**, 1407-1411.
7. Cook P. Cancer of the oesophagus in Africa. A summary and evaluation of the evidence for the frequency of occurrence and a preliminary indication of the possible association with the consumption of alcoholic drinks made from maize. *Br J Cancer* 1971, **25**, 853-880.
8. Chen F, Cole P, Zhibao M, Xing L. Corn and wheat-flour consumption and mortality from esophageal cancer in Shanxi, China. *Int J Cancer* 1993, **53**, 902-906.
9. De Stefani E, Munoz N, Esteve J, Vassallo A, Victoria CG, Teuchmann S. Mate drinking, alcohol, tobacco, diet, and esophageal cancer in Uruguay. *Cancer Res* 1990, **50**, 426-431.
10. Walford RL, Harris SB, Gunion M. The calorically restricted low-fat nutrient-dense diet in Biosphere 2 significantly lowers blood glucose, total leukocyte count, cholesterol, and blood pressure in humans. *Proc Natl Acad Sci USA* 1992, **89**, 11533-11537.