

- Promoting Effect of Bile Acids on Colon Carcinogenesis after Intrarectal Instillation of *N*-Methyl-*N'*-nitro-*N*-nitrosoguanidine in Rats. *J. Natl. Cancer Inst.*, 53: 1093-1097, 1974.
11. National Cancer Institute, Biometry Branch. The Third National Cancer Survey Advanced Three Year Report 1969-1971 (Excluding Carcinoma in situ). Bethesda, Md.: National Institutes of Health, DHEW Publication No. (NIH) 74-637, February 1974.
  12. Pour, P., Kriger, F. W., Albhoff, J., Cardesa, A., and Mohr, N. Cancer of the Pancreas Included in the Syrian Golden Hamster. *Am J. Pathol.*, 76: 349-354, 1974.
  13. Sampliner, R. E., Bennett, P. H., Comess, L. J., Rose, F. A., and Burch, T. A. Gallbladder Disease in Pima Indians. Demonstration of High Prevalence and Early Onset by Cholecystography. *N. Engl. J. Med.*, 283: 1358-1364, 1970.
  14. Wynder, E. L., and Hoffmann, D. Tobacco and Tobacco Smoke. Studies in Experimental Carcinogenesis, pp. 730-758. New York: Academic Press, Inc., 1967.
  15. Wynder, E. L., Mabuchi, K., and Beattie, E. J., Jr. The Epidemiology of Lung Cancer: Recent Trends. *J. Am. Med. Assoc.*, 213: 2221-2228, 1970.
  16. Wynder, E. L., Mabuchi, K., and Maruchia, N. Epidemiology of Cancer of the Pancreas. *J. Natl. Cancer Inst.*, 50: 645-667, 1973.

## Informal Discussion following the Paper by Wynder

**Dr. Pledger:** Dr. Wynder, you have referenced the Jewish population of New York City as having a higher frequency of pancreatic cancer. Is this conclusion in relation to the environs of the city, or do you have data from other Jewish populations residing outside of the city?

**Dr. Wynder:** We are about the only group in the country that does this kind of epidemiological research. From that point of view we are fortunate to be in New York, for here there are more Jews than in Israel. But to answer your original question, those data are not available for the Jewish population in other cities at present.

A very fruitful area for more research would be Israel, where Michael Davies' studies do not yet contain sufficient cases. He has shown for colon and breast cancers that the Jew from Europe has a high rate of these diseases, as well as coronary disease. On the other hand, the Jews that came from Asia and Africa have the lower rates of the populations from which they came. From this it appears that it is not genetic but environmental.

**Dr. Scarpelli:** I would like to ask whether the P/S ratios shown in one of your tables refers to the amount of polyunsaturated *versus* saturated fatty acids in blood?

**Dr. Wynder:** Yes, the P/S ratio comes from our colleagues in the coronary artery disease field where they are further advanced in the area of nutrition. It has only been in recent years that nutrition has begun to be considered important in the cancer field. In fact, the American Cancer Society and the National Cancer Institute are sponsoring an international workshop on nutrition and cancer that I have the privilege of chairing with Dr. James Peters of the National Cancer Institute and Dr. Steven Vivona of the American Cancer Society.

**Dr. Flamm:** To what extent do the factors identified in your talk explain the rather marked increase in pancreatic cancer rates occurring in the last decade in your general population?

**Dr. Wynder:** First of all, when we talk about increase of any

disease, we have to make sure it is real. Clinicians know how difficult it is to diagnose cancer of the pancreas and, particularly, the population that is not properly posted. Years ago there were quite a number of people posted; we now post fewer people. Part of the increase in pancreatic cancer may well be due to better diagnosis, particularly in our cancer centers, but clearly the rise in cigarette smoking may also contribute to the increase.

In addition, there has not only been an increase in fat consumption by the general population, but that increase has coincided with the fact that the population is becoming more sedentary. It has been shown in several studies that, if you take population groups and induce them to exercise properly, elevated blood lipid levels can be reduced. To conclude, we have at least 3 or 4 factors that could account for the increase in pancreatic cancer: better diagnosis, more cigarette smoking, more fat intake, and a more sedentary way of living.

**Dr. Alarif:** I was wondering if in your studies you could find any common correlation between, say, preserved meat, particularly food which has nitrate in it, and cancer of the pancreas? Simply from an experimental point of view, you all know that nitrosamines and nitrosamides have been the more efficient agents for inducing pancreatic cancer. I was wondering, particularly, if people who eat corned beef sandwiches, for example, might have any significance in this respect.

**Dr. Wynder:** This is, of course, one area to be considered. My colleague, John Weisburger, holds a similar concept which we discuss frequently. In terms of a classical epidemiological study, however, the kind of detailed dietary history that would be necessary to include is almost impossible to obtain.

In terms of diet, the only thing we can do is to look at special population groups within our own country. The Seventh Day Adventists are a good example. Sometimes one thinks one has to go to Africa or to Outer Mongolia to do a good epidemiological study, but we can do it right here in our own country. The Seventh Day Adventists, as you know, don't smoke or drink, eat very little meat, and have a

serum cholesterol level of around 190 mg/100 ml. As a result, a number of studies including those by Roland Phillips of the Seventh Day Adventists' Loma Linda University in California and our own have shown that almost all these diseases on which I have been commenting and which relate to "overnutrition," including cancer of the pancreas, are less common among this population.

I know that doesn't specifically answer your question on meat, but really I don't know how it can be answered since one cannot undertake a controlled laboratory experiment on man. I do think that the Seventh Day Adventists underscore the relationship of "overnutrition" and cancer in man.

Further, a problem we have as a society is to differentiate between average and normal. Those of you who are clinicians know that when a patient has a cholesterol of 230 mg/100 ml, the average doctor will say that's normal. He confuses normality with average. If you ask me what the normal cholesterol should be for our kind of sedentary life, I would say that it should be less than 150 mg/100 ml. We are hyperlipidemic as a nation, and this, I think, is a key problem.

**Dr. Segaloff:** One of the things that strikes me is that not only is there cancer of the pancreas, but in the rest of the listed features the same people also have an increased

incidence of diabetes mellitus. What does that have to do with it?

**Dr. Wynder:** The relationship of diabetes to cancer of the pancreas is very complex, and I will cite an example for you. Kessler has shown that if you take diabetes in general, let's say 2 years or less before diagnosis, you find more diabetes among patients with pancreas cancer. Obviously, this finding could be related to the lesion itself. We took as diabetes only those who had diabetes for 2 years or more. We showed some relationship for women, but not for men. What does it mean? Does it mean it is related to some dietary factor that makes women even more susceptible to diabetes as well as to pancreas cancer?

What we really are doing is presenting the epidemiological data, and then we hope to get the fertile minds of people like Drs. Segaloff and Fitzpatrick, and the chemists, to interpret what nature is trying to tell us. I learned from my father, who also was a physician, to listen to the patient; he will give you the diagnosis; and this is really what epidemiology is all about. Listen to what the patient has to say and then take leads back to the laboratory. Unfortunately, we tend to listen to our patients less and less, and I believe that if we listened to them more, we would get additional clues that would help us answer the problems confronting us.