NUTRIENTS AND OTHER RISK FACTORS ASSOCIATED WITH CANCER

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The winds of change are sweeping across the face of cancer research and there is some exciting new information becoming available on risk factors and prevention of some forms of neoplasia. Studies about viral carcinogenesis, represented by the sophisticated studies with respect to AIDS; chemoprevention with retinoids, selenium and other substances; and the general aspects of lifestyle, including diet, are all encouraging, pointing toward eventual prevention.

We are gradually accepting the fact that epidemiology, while it offers interesting potential approaches to some problems, leaves much to be desired with respect to causal relationships between dietary nutrients and some forms of cancer. It is one thing to identify a subset of the population who smoke cigarettes and link this habit to lung cancer. It is quite a different matter to link green and yellow vegetables to carotene and thus to prevention of some forms of cancer. We must continue to question epidemiologic approaches, whether population based, case-control or cohort, when the results are to be used as a basis for intervention in some subsets of the population with far-reaching implications.

Perhaps we should use well-designed, rigidly controlled animal studies to guide epidemiologists, rather than vice versa. The diet of the American public is very heterogeneous and there are many confounding variables. Table 1,
taken from the HANES report (1979), illustrates this point. In any case, the entire area of diet, nutrition and cancer is yielding to increasingly sophisticated, elegant methodology and we can expect to see even more promising directions for prevention in the future.

Table 1
Nutrient Intake by Percentiles of the US Population
Percentile of Population

<table>
<thead>
<tr>
<th>Daily protein (g)</th>
<th>5th</th>
<th>10th</th>
<th>20th</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
<th>X</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>8813 males</td>
<td>36</td>
<td>46</td>
<td>62</td>
<td>84</td>
<td>114</td>
<td>153</td>
<td>179</td>
<td>93</td>
<td>45</td>
</tr>
<tr>
<td>11930 females</td>
<td>25</td>
<td>31</td>
<td>43</td>
<td>59</td>
<td>79</td>
<td>102</td>
<td>119</td>
<td>64</td>
<td>31</td>
</tr>
<tr>
<td>Daily vitamin A (IU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8813 males</td>
<td>801</td>
<td>1184</td>
<td>2057</td>
<td>3503</td>
<td>5951</td>
<td>9796</td>
<td>13770</td>
<td>5138</td>
<td>7245</td>
</tr>
<tr>
<td>11930 females</td>
<td>575</td>
<td>872</td>
<td>1548</td>
<td>2714</td>
<td>4781</td>
<td>8581</td>
<td>12625</td>
<td>4431</td>
<td>8016</td>
</tr>
</tbody>
</table>
(From DHEW Publication #79-1221, 1979).

This presentation will discuss epidemiological suggestions and results of experimental studies relative to a few specific sites for cancer.

I. CANCER OF THE ESOPHAGUS

A. Epidemiologic Evidence

An early observation of an association between esophageal cancer and nutrition was made nearly 50 years ago. It was observed that Swedish women suffering from cancer of the hypopharynx, frequently had anemia; this appeared to be secondary to iron deficiency and perhaps multiple vitamin deficiencies (Jacobson, 1961). This syndrome, named the Plummer-Vinson syndrome, has since that time greatly decreased in incidence along with general improvement in iron and vitamin nutrition in that area.

Esophageal cancer represents the most striking geographic variation, of any tumor site. There is a wide disparity in incidence of this type tumor from country to country and from region to region within countries, suggesting environmental influences. Some of the highest incidence rates in the world are found in South-Central Asia in the region between Turkey, Iran, China, and the Soviet Union. Investigations of this region have shown that these