Fish Consumption and Coronary Artery Disease in China

To the Editor:

As Dallongeville et al. indicated in the introduction of their article, it has been well established that fish consumption has a protective cardiovascular effect. To the existing theories of this association, the authors added another: fish consumption is associated with decreased heart rate and thus lower risk of sudden death because heart rate is positively associated with risk of sudden death.

The protective effect of fish consumption on coronary artery disease was known in China nearly four decades ago. In an epidemiological study on the regional differences in incidence of coronary artery disease in people over 40 years of age in China, which was carried out by the Cardiovascular Institute, Fu Wai Hospital of the Chinese Academy of Medical Sciences, Beijing, China, it was noted that the lowest incidence of coronary artery disease (0.6%) was in the fishermen in Choushan archipelago (Table).2

That eating fish has a beneficial effect and eating animal fat has an unfavorable influence on the incidence of coronary artery disease is further revealed by two observations noted in the Table. First, the incidence of coronary artery disease is lower in Kwangtung (now Guangdong) in southern China (2.01%) than in Peking (now Beijing) in northern China (4.4%).2 The southerners eat more fish than the northerners not only because the former have more ready access to fish in the water (Guangdong is a coastal province) but because the northerners have to eat more animal fat to meet the fuel requirements necessitated by the colder weather in the north, and Beijing is inland.

The second and more important observation is that in the same province in China, the more animal fat there is in the diet, the higher the incidence of coronary artery disease. In Sinkiang (now called Xinjiang), the nomads, who eat predominantly animal fat, have nearly eight times (19.75%) as much coronary artery disease as the cadres (2.46%).2

This observational study from China2 was recently confirmed by a prospective study from Shanghai, China.3 Two additional studies published in June in this journal4,5 rendered further support to this association. Therefore, the positive association between fish consumption and coronary artery disease and/or sudden death is not a fishy story after all.

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Response

Early ecological studies had shown significantly lower rates of cardiovascular disease in populations that traditionally consumed a lot of fish. These observations were later clarified in cohort studies from North America and Europe and in secondary prevention trials showing a lowering of fatal cardiovascular events in patients supplemented with fish or fish oil concentrates.

Meanwhile, it has become evident that the lowering of triglycerides and the modest effects of n-3 fatty acids on hemostasis could not, in itself, explain the spectacular reduction in fatal cardiovascular events observed in trials. Recently, the ascribing of major antiarrhythmic properties to fish oil6 and of favorable morphological changes in carotid plaque2 associated with fish oil supplementation have shed new light on the cardiovascular protective properties of fish oil. However, most of the evidence on the antiarrhythmic effects of eicosapentaenoic and docosahexaenoic fatty acids was acquired

### Regional Differences in Incidence of Coronary Artery Disease (General Survey of People more than 40 Years of Age)*

<table>
<thead>
<tr>
<th>Year</th>
<th>Region</th>
<th>Male No.</th>
<th>Male Incidence (%)</th>
<th>Female No.</th>
<th>Female Incidence (%)</th>
<th>Total No.</th>
<th>Total Incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>Peking</td>
<td>2726</td>
<td>2.19</td>
<td>641</td>
<td>3.57</td>
<td>3367</td>
<td>2.45</td>
</tr>
<tr>
<td>1960</td>
<td>Shanghai</td>
<td>5473</td>
<td>3.20</td>
<td>1806</td>
<td>3.20</td>
<td>7279</td>
<td>3.20</td>
</tr>
<tr>
<td>1965</td>
<td>Kansu</td>
<td>1129</td>
<td>1.86</td>
<td>155</td>
<td>9.03</td>
<td>1284</td>
<td>2.73</td>
</tr>
<tr>
<td>1965</td>
<td>Szechuan</td>
<td>217</td>
<td>7.37</td>
<td>66</td>
<td>8.46</td>
<td>283</td>
<td>7.77</td>
</tr>
<tr>
<td>1965</td>
<td>Peking (factory workers)</td>
<td>500</td>
<td>4.40</td>
<td>...</td>
<td>...</td>
<td>500</td>
<td>4.40</td>
</tr>
<tr>
<td>1965</td>
<td>Choushan (fisherman)</td>
<td>1625</td>
<td>0.60</td>
<td>...</td>
<td>...</td>
<td>1625</td>
<td>0.60</td>
</tr>
<tr>
<td>1965</td>
<td>Sinkiang (Xinjiang)</td>
<td>195</td>
<td>2.46</td>
<td>...</td>
<td>...</td>
<td>195</td>
<td>2.46</td>
</tr>
<tr>
<td></td>
<td>Cadres</td>
<td>81</td>
<td>19.75</td>
<td>...</td>
<td>...</td>
<td>81</td>
<td>19.75</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>276</td>
<td>7.60</td>
<td>...</td>
<td>...</td>
<td>276</td>
<td>7.60</td>
</tr>
<tr>
<td>1971</td>
<td>Shanghai (factory workers)</td>
<td>1747</td>
<td>6.90</td>
<td>...</td>
<td>...</td>
<td>1747</td>
<td>6.90</td>
</tr>
<tr>
<td>1971</td>
<td>Kwangtung (Guangdong)</td>
<td>912</td>
<td>1.54</td>
<td>181</td>
<td>4.40</td>
<td>1093</td>
<td>2.01</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>14,605</td>
<td>3.08</td>
<td>2849</td>
<td>3.83</td>
<td>17,454</td>
<td>3.20</td>
</tr>
</tbody>
</table>

*Courtesy of the Cardiovascular Institute, Fu Wai Hospital of the Chinese Academy of Medical Sciences (Beijing, China).
in experimental conditions or highly controlled clinical trial conditions with fish oil concentrates. Although these data provided a major support for clinical recommendations at the population level, there was until now no evidence that consumption of fish, rather than concentrates, had an impact on cardiac rhythm. Our study plugs this gap and, thus, provides the first evidence that consumption of fish in daily life is associated with lower heart rates. Moreover, the finding, in our study, of a similar association in Northern Ireland and France—two countries with contrasting nutritional habits and cardiovascular mortality rates—supports a robust association.

The findings of similar ecological cardioprotective relationships and favorable associations in a cohort from China—a country with a very different lifestyle, nutritional habits, and low cardiovascular event rates compared with other continents—reinforce the ubiquity of this association. As pointed out by Dr Cheng, it remains to be clarified whether the finding of low incidence of coronary heart disease rates among fish consumers in Chinese ecological and cohort studies results from the substitution of saturated fat from meat with n-3 fatty acids from fish, possibly resulting in lower LDL-cholesterol levels and diminished coronary atheroma formation, or whether, in China—as in North America and Europe—the fish n-3 fatty acids have also a significant impact on sudden death.

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