

## THE RELATION BETWEEN CANCER OF THE COLON AND RECTUM AND NUTRITION, IN RIO DE JANEIRO

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Many authors (1-7) have emphasized the importance of the environment factor, claiming the relevance of the usual diet on the development of neoplasms of the large intestine and rectum.

Trowell (8) pointed out the contribution of epidemiological studies to the establishment of the world-wide distribution of the disease. In Brazil few papers have been published on the subject (9, 10).

Recent publications (11-13) describe alterations of the colon, secondary to the refined diet commonly consumed in industrialized countries, as well as the presence of gastrointestinal diseases among people living in areas where diet is deficient in fiber.

Diets rich in fat and deficient in fiber are considered by many authors (11, 13-17) as the most important environmental factor in the development of cancer of both colon and rectum.

A retrospective study on the type of diet consumed by two groups of subjects was carried out. The Experimental Group, formed by

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**TABLE 1**  
**CUSTOMARY DIETS PREPARED FOR THE CONTROL AND**  
**EXPERIMENTAL GROUPS**  
**(g/100 g diet)**

Foods groups	Control group	Experimental group
Rice	11.50	12.00
Salted cracker	0.60	0.40
Corn meal	—	1.27
Macaroni	2.71	1.99
Bread	5.64	4.77
Pastry	0.38	—
Sweet cassava	0.75	0.64
Sweet potato	1.13	1.27
Potato	2.63	4.53
Powdered sweet cassava	0.53	0.79
Yam	0.15	0.56
Sugar	2.86	4.13
Fruit preserve	—	0.79
Creamed fruit	0.23	0.79
Sugar cane juice	—	0.16
Condensed milk	—	0.16
Black bean	11.65	9.14
Black bean sauce	—	2.38
Butter bean	1.05	—
Pea	0.30	—
Lettuce	1.13	0.56
Water cress	0.38	0.24
Nightshade malabar	0.45	0.16
Chicory	0.23	0.32
Kale	0.38	0.56
Spinach	0.45	0.16
Cabbage	0.75	0.48
Water squash	0.83	0.56
Chayote	0.98	0.87
Nightshade fruit	0.38	0.16
Gherkin	—	0.16
Cucumber	0.53	—
Green pepper	0.45	—
Okra	0.38	0.16
Tomato	2.93	0.87
Green bean	0.75	0.56
Beet	0.23	—
Onion	1.35	0.40
Carrot	—	0.56
Taro leaf	—	0.16
Small banana	3.08	2.22
Whole orange	6.02	2.30

Foods groups	Control group	Experimental group
Orange juice	4.14	2.07
Apple	1.13	0.24
Papaya	2.33	3.18
Banana	—	0.56
Pear	0.90	1.01
Natural fruit juice	1.88	5.64
Beef	7.71	0.90
Pork	1.83	1.20
Chicken	1.83	1.58
Sea food	1.03	1.27
Dried beef	—	0.24
Liver	—	0.48
Sausage	0.38	1.51
Eggs	1.05	12.55
Milk	9.47	1.75
Cheese	1.20	—
Yogurt	0.23	0.71
Butter	0.38	0.32
Margarine	0.53	2.78
Vegetable oil	2.26	0.32
Bacon	0.15	0.32
Lard	—	0.08
Mayonnaise	—	0.87
Coffee	0.75	—
Black tea	0.15	—
Quick	—	0.16

TABLE 2  
FAT AND FIBER INTAKE FOUND IN DIFFERENT POPULATIONS  
(g/day)

Food Consumption	Brazil		Finland	Denmark	England	New York
	Niterói		rural	Copenhagen	Cambridge-	USA
Area	Control	Exper.	Kopio (19)	(19)	shire (20)	(21)
Fat	76.57	128.75	91.4 ±	79.2 ±	97.1 ±	115.0 ±
Dietary fiber	35.63	25.15	23.9	25.2	28	3
Lignin	7.48	3.94	30.9 ±	17.2 ±	19.9 ±	14.0 ±
Cellulose	12.02	9.65	11.3	5.09	5.3	2
Hemicellulose	16.53	11.53	3.14 ±	1.42 ±	1.4 ±	—
			1.73	0.66	0.9	
			7.95 ±	4.94 ±	4.7 ±	—
			2.49	1.59	1.2	
			19.8 ±	10.9 ±	13.8 ±	—
			7.86	3.16	3.7	

patients with neoplasms of the large intestine and rectum. These were chosen from people who had lived in Niterói (Rio) for more than 10 years, with ages ranging from 35 to 85 years and who had been diagnosed to be affected by cancer of the colon or rectum during the period 1979-1983.

The Control group was integrated by 20 healthy individuals selected from the same population (Niterói). They were considered to be free from constipation, diarrhea, colitis, appendicitis, diverticulitis or hemorrhoids.

Both groups were submitted to a detailed inquiry as to their dietary habits according to Nomura, Hankins and Rhoads (18). Table 1 shows the diets in question, which were prepared on the basis of data obtained from the subjects (19). The total food intake was 1,475 g/day in the Control Group, and 1,271 g/day in the Experimental Group.

The fat and fiber content of the usual diet consumed by the Control and Experimental Groups, respectively, compared to those found in other countries, is presented in Table 2.

In people from the rural areas of Juopio, Finland, the incidence<sup>4</sup> of cancer of the colon is 6.2 and of cancer of the rectum, 7.4. These values are low when compared to those found in Denmark, England and Germany, which are: 17.5, 16.3 and 10.7 for the former (colon), and 17.7, 16.7 and 13.3 for the latter (rectum), respectively (19-22), in contrast to those found in the rural area of Finland, where the higher content in dietary fiber is found.

The fat/fiber proportion of the habitual diet in countries with a high incidence of cancer (Denmark, England and the United States) varies from 5:1 to 8:1, whereas in areas with low incidence (Finland), such proportion is 3:1. Our Control Group had the lowest value (2:1) while our Experimental Group exhibited the same proportion described in countries where high prevalence (5:1) prevails.

These findings strongly suggest a carcinogenic role of the high fat/low fiber proportion in the customary diet.

#### SUMMARY

A retrospective study was carried out on the type of habitual diet consumed in the Niterói (Rio de Janeiro) city. Two groups of subjects were integrated: the Experimental Group, formed by patients with neoplasms of the large intestine and rectum, and the Control Group, formed by individuals with no gastrointestinal disorders.

The information obtained through direct inquiry, strongly suggests that cancer of the colon and rectum may be related to the high proportion of fat and low proportion of dietary fiber found in the diets of the patients studied.

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<sup>4</sup> Adjusted rates of 100,000 people.

## RESUMEN

## LA RELACION ENTRE EL CANCER DEL COLON Y DEL RECTO Y LA NUTRICION, EN RIO DE JANEIRO

Se llevó a cabo un estudio retrospectivo del tipo de dieta de consumo habitual en la ciudad de Niterói (Río de Janeiro). Se integraron dos grupos de sujetos: el Grupo Experimental, formado por pacientes que sufrían de neoplasmas del intestino grueso y del recto, y el Grupo Control, compuesto por individuos que no padecían de trastornos gastrointestinales.

La información recabada a través de preguntas directas sugiere fuertemente que el cáncer del colon y del recto puede estar relacionado con la alta proporción de grasas y baja proporción de fibra que acusan las dietas de los pacientes sometidos a estudio.

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