

Seafood and cancer

Researching fish consumption and health of the colon and rectum...

Colorectal cancer, or cancer of the large bowel, is one of the most significant causes of morbidity and mortality in the Western world and it is a growing problem in developing countries. Colorectal cancer is the third most common cancer in the world with approximately two million new cases each year. The highest incidence of colorectal cancer is seen in many European countries, in North America, Australia and New Zealand. The incidence is rising in countries like Japan, where many citizens are changing their dietary habits towards a more Westernised diet. In addition, Japanese who moved to the United States have an increased incidence of colorectal cancer compared to Japanese in Japan. Furthermore, African Americans have an enormous increased risk compared with Africans living in Africa. This all suggests that lifestyle, diet and physical activity play an important role in the development of colorectal cancer.

The development of colorectal cancer is a slow process. The development of colorectal tumours takes usually decades and involves the accumulation of a series of genetic defects that lead to the development of cancerous tissue. This implies that it is a disease mainly confined to people who are elderly, although the incidence starts to increase from the age of 50 onwards.

Diet and colorectal cancer

Traditionally most of the research on diet and cancer has focussed on negative aspects of food, such as the presence of carcinogenic compounds like dioxins, PCBs, and methyl mercury. Also there is research on the effects of food and nutrition on colorectal cancer. In 1981 it was

estimated that 10-70% of the colorectal cancer cases could be attributed to diet. In 2007, the World Cancer Research Fund (WCRF) published a systematic review report on food, nutrition, physical activity and the prevention of cancer, concluding that food and nutrition have a highly important role in the prevention and causation of colorectal cancer. Foods like red and processed meat, consumption of alcohol, and body and abdominal fatness increase the risk of colorectal cancer whereas foods containing dietary fibre, garlic, milk, and calcium probably protect against colorectal cancer. Consumption of fish also has been associated with a reduced risk of colorectal cancer.

Seafood and colorectal cancer

Evidence on a relationship between fish intake and colorectal cancer in humans comes from observational studies. In these studies, the association between the habitual intake of seafood and colorectal cancer is studied. In case-control studies the fish consumption of patients with colorectal cancer is compared with the fish consumption in healthy controls. All case-control studies taken together give an equivocal picture; some studies showed a protective effect of fish intake on colorectal cancer whereas other studies did not find this. From these studies, it remains unclear whether intake of fish is associated with a higher or a lower risk of colorectal cancer.

Cohort studies, where population groups are studied, could provide a better insight in this association. In these studies the habitual fish intake of healthy people is associated with the incidence of colorectal cancer. Recently, the evidence of all these

studies was summarised, revealing that people consuming high amounts of fish had a 12% reduced chance of developing colorectal cancer. A general limitation of observational studies is that they can only identify a possible association between fish intake and colorectal cancer; to identify a possible causal relationship, randomised controlled trials are needed.

Within the Integrated Project SEAFODplus running in the period 2004-2008, the first randomised controlled trial on fish consumption and colorectal cancer was conducted in the FISHGASTRO study. In this trial, participants received either two weekly portions of salmon or cod, or no extra fish over a period of six months. Before the start of the intervention, material from the colon was taken, which was repeated after intervention. In this material from the colon, the researchers looked at cell division and cell death, which are used as markers for the risk of colorectal cancer. After six months, the rate of cell division or cell death had not changed in the people consuming salmon or cod compared with people not consuming any extra fish. However, it should be emphasised that a study over only six months is very short when the development of colon cancer usually takes very long time. We cannot disregard the results of previous observational studies, so it is important that new experiments are designed where it will be possible to figure out exactly how fish consumption can protect us from getting colorectal cancer.

A new research platform

Future research on seafood and cancer risk should focus not only on effects of omega-3 fatty acids, but also on other potentially beneficial



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components of seafood, such as vitamin D and selenium. This may lead to the development of new methods of aquaculture to produce fish with added health value. Meanwhile, we hold onto the current dietary recommendation to consume two weekly portions of fish, one of which is oily fish.

Future research on seafood and health is one key issue to be discussed in the recently launched SEAFOODplus Research Platform. The Integrated European Project SEAFOODplus was very successful in achieving the ambitious goals set and the results have been important for promoting the seafood area in general. SEAFOODplus has delivered several breakthrough research results in the areas of seafood and health, consumers and seafood, seafood safety, seafood quality and product development and aquaculture. This development was taken a step further by launching the SEAFOODplus research platform at the end of March 2009. This exciting initiative has been welcomed by the European

Commission and the seafood society. News items on the launching event are reported at www.seafoodplus.org. A very important task will be to fill the gaps between the different technology platforms already established and ERA-nets within the KBBE area.

This platform aims to stimulate international integrated multidisciplinary seafood research covering the whole production chain from aquaculture and fisheries to consumers' health and wellbeing. Project ideas from the scientific community and industry in this platform will be brought forward via the channels of the European Commission in addition to existing technology platforms. Health aspects and how seafood in the diet impacts major lifestyle diseases like cancer and also diabetes, cognitive development and decline – these are on the roadmap to be discussed. In this context, lipids, proteins, amino acids, and trace elements from seafood are believed to have metabolic effects beyond known functions of omega-3 fatty acids.

Any entity – from a research organisation or a university covering the research area described in the mission of the SEAFOODplus research platform – can become a member. Industries and seafood organisations are also welcome to become associate members of the SEAFOODplus research platform.



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