Does fish consumption modify risk of colorectal disease in humans?

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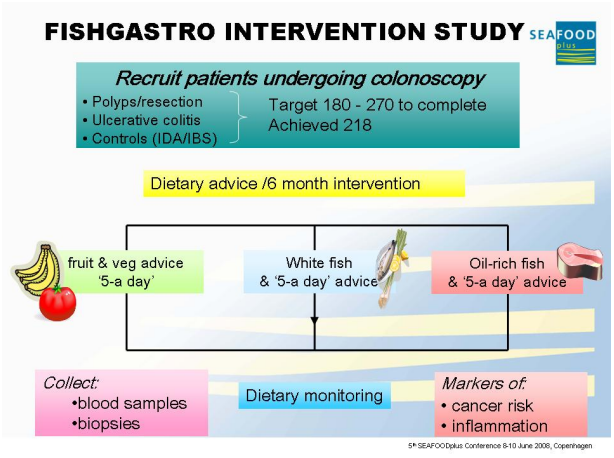

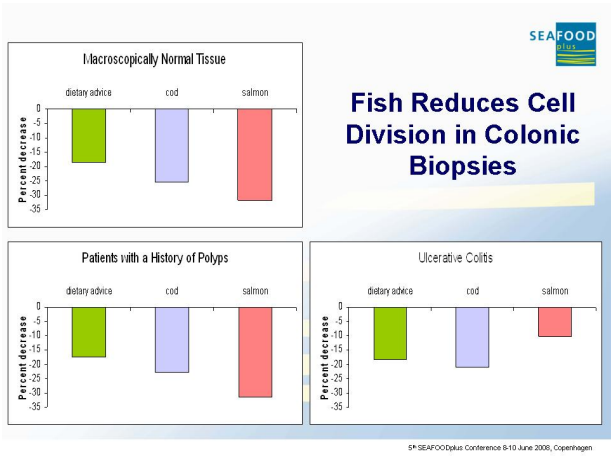

Introduction: Recent population based studies suggest that people who eat two or more portions of fish a week have a reduced risk of colorectal cancer. It is unclear as to whether this is due to the omega-3 fatty acid content of fish, in particular oil-rich fish; however, previous animal and cell culture studies would suggest these are protective in relation to gastrointestinal health. For example they increase cell death (apoptosis) of cancer cells and reduce cell division. Both of these parameters are indicators of reduced cancer risk, although we currently have no good predictors of disease risk. We have therefore undertaken a human intervention study (The SEAFOODplus FISHGASTRO study) to assess the impact of two types of fish, salmon and cod, on markers of gastrointestinal health, with a secondary aim to develop better markers of risk using post genomic technologies.
Methods: Volunteers (240), either apparently healthy or at increased risk of colorectal cancer or with inflammatory bowel disease were recruited from gastroenterology clinics in The Netherlands and UK between December 2004 and January 2008. Volunteers were randomised to one of three interventions: (a) dietary advice (DA), (b) cod (300g/week) +DA, (c) salmon (300g/week) +DA. Colon biopsies, blood and faecal samples were collected at the start and after 6 months intervention. Dietary intake was recorded.
Results: Volunteers showed good compliance to the fish interventions with salmon consumption significantly increasing serum fatty acid content. We will present how this then affects the levels of apoptosis and mitosis in biopsy samples, the primary end-points of the study. We have also measured the impact on DNA damage in sub-sets of participants in biopsies and in cultured cells exposed to faecal water. Fish consumption significantly affected levels of mRNA in colorectal biopsies for a wide range of genes with a greater impact of salmon than of cod.
Conclusion: These data will allow us to better understand the mechanisms by which fish consumption may help prevent colorectal disease.

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