



Review

Alcoholic beverages, obesity, physical activity and other nutritional factors, and cancer risk: A review of the evidence



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ABSTRACT

Purpose: Prevention is a priority in the fight against cancers, especially nutritional prevention. To update the levels of evidence of relationships between 10 nutritional factors and cancer risk, the scientific literature published from 2006 to 2014 was reviewed by an expert group.

Methods: Data from 133 meta-analyses, pooled analyses or intervention trials were examined. Nearly 150 relationships between nutritional factors and cancer at various sites were evaluated.

Results: According to the evidence graded as convincing or probable, these factors were divided in two groups. Factors which increase the risk of cancer are alcoholic beverages, overweight and obesity, red meat and processed meat, salt and salted foods and beta-carotene supplements. Factors which decrease the risk of cancer are physical activity, fruits and vegetables, dietary fiber, dairy products and breastfeeding.

Conclusion: Three main nutritional objectives should be attained to improve cancer prevention: to reduce alcoholic beverages consumption, to have a balanced and diversified diet and to be physically active.

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1. Introduction

The worldwide burden of cancer has been estimated to 14 million new cases for the year 2012, the most common cancers diagnosed globally being those of the lung, breast, and large bowel. This figure is expected to rise to 22 million per year within the next two decades (Ferlay et al., 2013). This alarming situation emphasizes the need for urgent prevention measures to win the battle against cancer (IARC, 2014a).

Prevention strategies must be based on a better evidence-based knowledge of factors able to either increase or decrease cancer risk. Cancer is a multifactorial disease involving genetic, environmental and behavioral factors, the latter including nutritional factors that comprise diet, alcohol consumption, body fatness and physical activity. For more than two decades, the World Cancer Research Fund (WCRF) and the American Institute for Cancer Research (AICR) have joined their efforts to summarize, assess and judge the evidence on nutritional factors and the risk of various cancers. Since their report published in 2007 (WCRF/AICR, 2007), the WCRF/AICR expert panel keep updating the evidence for individual cancer sites, according to the Continuous Update Project (CUP), in collaboration with a team of the Imperial College of London (ICL) in charge of systematic reviews and meta-analyses of epidemiological data, independently of the expert panel's judgement of the evidence.

In 2013, within the framework of the third Cancer Plan (2014–2019), the French National Institute of Cancer (INCa) decided to review the most recent scientific literature and update the levels of evidence for the relationships between risk of cancers and nutritional factors. Ten nutritional factors were considered: alcoholic beverages, overweight and obesity, red meat and processed meat, salt and salted foods, beta-carotene supplements, physical activity, fruits and vegetables, dietary fiber, dairy products, breastfeeding. They were selected on the basis of the following criteria: (i) relevant in terms of modifiable exposure for the French population and more generally for developed countries and (ii) level of evidence qualified as convincing or probable in the 2007 WCRF/AICR report (WCRF/AICR, 2007) for at least one cancer site. For these factors, the levels of evidence have been evaluated by WCRF/AICR in the 2007 main report (WCRF/AICR, 2007), and 2010–2014 CUP reports on breast, colorectal, pancreatic, endometrial and ovarian cancers (WCRF/AICR, 2010, 2011, 2012, 2013, 2014a). However, many epidemiological studies have been published since then, requiring a reassessment of the levels of evidence.

2. Methods

2.1. Evaluation process

From April 2013 to March 2015, INCa gathered an expert group bringing together scientists from the French network on Nutrition And Cancer Research (NACRe network), who have expertise in the field of nutrition and cancer. The modalities for the systematic literature review and evaluation of the evidence have been discussed and adopted by the expert group. Notably, the nutritional factors and types of studies to consider, the search strategies, and the selection criteria for publications have been defined. The bibliographic review was divided among experts according to their respective competences. The method of bibliography analysis, the nature of data to extract from articles and the criteria for evaluating the levels of evidence for the relationships between nutritional factors and risk of cancers have been defined by the expert group. They are summarized in the next section.

2.2. Search strategy and selection criteria

Searches were conducted in PubMed database from January 2006 to February 2014, restricted to English language, by combining medical subject headings (MeSH) and/or entry terms. Study types were limited to meta-analyses, pooled analyses and intervention trials. Search strategies for each of the 10 selected nutritional factors are detailed in Appendix A, Part 1. For each nutritional factor, the title and abstract of all references provided by the search were examined by one expert to select potential relevant full-text articles, any uncertainties being resolved by discussion within the expert group. Studies were selected if they met the following inclusion criteria: meta-analysis, pooled analysis or intervention trial, association between one of the 10 selected nutritional factors and cancer risk in adults, report of hazard ratio (HR), relative risk (RR) or odds ratio (OR) and of their 95% confidence interval (CI). Studies on a specific cancer site were selected if their publication date was subsequent to the more recent WCRF/AICR report (2007 main report or CUP report on this cancer site) (WCRF/AICR, 2007, 2010, 2011, 2012, 2013, 2014a); publications from the ICL team were considered as new meta-analyses if they provided updated or additional results as compared to those presented in the “systematic literature review” reports associated to the main WCRF/AICR or CUP reports (WCRF/AICR, 2007, 2010, 2011, 2012, 2013, 2014a). The outcome

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