

Editorial

Obesity Cancer Links - Overview

The supplement within this volume of *The Open Obesity Journal* focuses on emerging links between obesity and increased risk of various cancers. Obesity and cancer incidence are both increasing worldwide. The global obesity epidemic in adults and children presents bleak prospects for reducing or preventing obesity related cancers. Consequently, an understanding of how obesity leads to increased cancer risk will be important to reduce this risk in individuals who are obese. Increased obesity, particularly in childhood, may significantly influence the future incidence of obesity related cancers. This supplement considers the epidemiological evidence, the molecular mechanisms involved and potential considerations and strategies to prevent or reduce obesity associated cancers.

Cancer has been recognized as a human disease since ancient times and is recorded on ancient Egyptian papyrus. Subsequent observational studies over centuries proved ineffective in developing cancer treatment and prevention. The role of cancer epidemiology, launched in the 18th century, has been instrumental in providing scientists with a research focus to investigate cancer etiology. This was followed by the introduction of concepts and fundamental discoveries throughout the 19th – mid 20th century that precipitated the rapid and significant progress in understanding cancer etiology over the past 50 years. More recently, during the last two to three decades, cancer epidemiology has been fundamental in highlighting the role of diet and lifestyle factors in the lifetime risk of developing cancer. Importantly, cancer epidemiology indicates that modification of diet and lifestyle factors could have a major impact on preventing the worldwide increase in cancer incidence that is occurring despite the intensive research on cancer etiology and treatment.

Evidence of the impact of obesity on increasing the lifetime risk of developing a number of organ specific cancers is now unequivocal. Establishing the links between obesity and cancer is a significant achievement of scientific research in the cancer field. The publication of a global report by WCRF/AICR on food, nutrition, physical activity and cancer prevention [1], followed by their Policy Report 2009 [2] summarized the efforts of numerous researchers in the field over the past decade and clearly emphasized the considerable evidence linking obesity and associated sedentary lifestyle factors with increased cancer risk. Renehan *et al.* elaborate further in this supplement on the consonant global patterns associating obesity with sex-specific cancers and evidence that obesity impacts on malignancies other than those highlighted to date and importantly present evidence of a causal relationship.

The WCRF/AICR global report [1] concluded that up to 20% of obesity-related cancers could be prevented. Current epidemiological data cannot reveal calculable risks of obesity related cancer in children, young adults or indeed the impact of obesity on the developing fetus since the outcomes are yet to be experienced and documented. Understanding and prediction of future cancer risk and incidence related to the obesity epidemic is therefore incomplete at present.

It is clear that no single research field can deal with the complex issues involved in researching links between obesity and cancer. There is a need for multidisciplinary groups and networks of scientists from both the obesity and cancer field, including teams involved in both basic and clinical research, to translate mechanistic and theoretical studies in model systems to individuals in the clinic and the public at large. Scientists researching this field have complex questions to address related to the multifaceted biological interactions that may explain the observed association between obesity and cancer risk. Investigations must combine the complex issues leading to increased obesity with the complex etiology and pathology of cancer. Cancer researchers need to understand the causes of obesity e.g. intake of dietary fats, high energy foods, reduced fruit and vegetable consumption, sedentary lifestyles. Site-specific cancers and confounding factors that may contribute to increased susceptibility to obesity related cancers e.g. genetics, gender, smoking, alcohol consumption must also be considered. Obesity alters metabolic profiles of hormones, such as leptin, adiponectin, insulin and inflammatory cytokines. The impact on regulation of homeostatic signalling systems and associated influences on cancer risk are considered within this supplement (see Fenton *et al.*, Nakajima *et al.* and Sobhani *et al.*).

If a reversal of the incidence of obesity related cancers is to be achieved it will be necessary to apply multi-disciplinary approaches to not only investigate the mechanistic factors but also carefully consider the strategies to reduce obesity or identified biochemical markers of obesity associated with increased cancer risk. Articles within this supplement (Harvie *et al.*, Beck *et al.*) consider strategies to counteract obesity related cancer by reducing obesity and associated markers, and discuss pertinent environmental and socioeconomic factors. Advances in screening and imaging technologies and medical interventions are obviously important in reducing cancer, but it will be increasingly difficult to cope with global trends, particularly in low income countries. Hence, it is important to promote current evidence that significant prevention of obesity related cancer is achievable by maintenance of body weight within the normal range. However, successful strategies to reverse obesity related cancers will be challenging. This is further highlighted in the review of gut microbial interactions associated with obesity in this supplement and consequences for gut pathology and cancer risk (Flint and Wallace). Consequently there is a need for further fundamental research to develop the most appropriate strategies to reduce obesity related cancers.

Promotion of personal recommendations and identification of public health goals to reduce cancer risk is a necessary first step, but more fundamental research is needed to elucidate the mechanisms involved in obesity related cancer. This will be achieved by insightful collaborations between scientists from both the obesity and cancer research fields, establishing robust scientific evidence to identify targets for prevention and treatment and prove the basis for policy initiatives to drive the fundamental changes in healthcare and human behaviour that are required to combat obesity related cancers.

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