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Cancer Because Mom and Dad Smoked?

When parents smoke, they lay the foundations for their child to develop cancer in later life. In particular, exposure to secondhand smoke in childhood increases the risk of nasal cancer. In addition, children of mothers who smoke have an increased risk of bladder and kidney cancers – as a delayed effect of their exposure to tobacco's breakdown products in the womb and through breast feeding.

The cancer-causing effect of tobacco smoke unfolds in many different ways, including indirect ones. Thus, parental smoking causes cancer risks in children from infancy that are not related to their later nicotine consumption or hereditary factors. This is the conclusion reached by Professor Kari Hemminki and Dr. Bowang Chen of the Division of Molecular-Genetic Epidemiology at the German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) in a study based on data of the national Swedish Cancer Register, which keeps record of cancer cases in Swedish families over several generations.

The scientists took the occurence of lung cancer as an indirect indicator of tobacco consumption of parents and selectively studied the offspring of lung cancer patients. They restricted the calculation of cancer risks to those organs that are known to be affected by the cancer-causing effects of tobacco products. Among the available data between 1958 and 2002, they identified about 18,000 mothers and 42,000 fathers with lung cancer. Among the offspring there are almost 174,000 cancer cases recorded in persons between the ages of 0 and 70 years. By comparison with the disease rates in offspring of non-smoking parents, the researchers were able to calculate specific cancer risks which cannot be accounted for by smoking habits of those affected or by hereditary risks.

Children of smoking mothers were found to have an elevated risk of developing cancer of the upper respiratory tract (standardized incidence ratio SIR: 1.45), nasal cancer (2.93, i.e. risk increased by almost three times), lung cancer (1.71), bladder cancer (1.52) and, in one age group, also of kidney cancer (6.41). Offspring of male lung cancer patients also showed an increased risk of nasal cancer (particularly adenoid cystic carcinoma, SIR: 7.73) and a number of other cancer types, but not of the bladder and the kidneys. "The effects on bladder and kidneys are not related to the smoking habits of the father and, thus, are probably accounted for by exposure to breakdown products of nicotine, which the child of a smoking mother takes in during prenatal life or with the breast milk and excretes through kidneys and bladder. These organs seem to be particularly sensitive to carcinogens during growth," Hemminki supposed. However, the increased risk of developing nasal cancer seems to be

triggered by passive smoking during childhood, since it was found to be unrelated to which parent smoked.

The task of the Deutsches Krebsforschungszentrum in Heidelberg (German Cancer Research Center, DKFZ) is to systematically investigate the mechanisms of cancer development and to identify cancer risk factors. The results of this basic research are expected to lead to new approaches in the prevention, diagnosis and treatment of cancer. The Center is financed to 90 percent by the Federal Ministry of Education and Research and to 10 percent by the State of Baden-Wuerttemberg. It is a member of the Helmholtz Association of National Research Centers (Helmholtz-Gemeinschaft Deutscher Forschungszentren e.V.).

This press release is available at www.dkfz.de/pressemitteilungen

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