



FAP = Familial Adenomatous Polyposis ♦ HCV = Hepatitis C virus ♦ HPV = Human papillomavirus ♦ CLL = Chronic lymphocytic leukemia ♦ AML = Acute myeloid leukemia

Caption: Relationship between the risk of cancer and the number of times stem cells divide in different types of body tissue over the course of a person’s lifetime. Lifetime risk (y-axis) is expressed as the base 10 logarithm of the probability of developing cancer, where 10^{-1} is 10% risk, 10^{-2} is 1% risk, and so forth.

BACKGROUND INFORMATION

Cancer is typically attributed to hereditary and environmental factors, but these only explain a fraction of overall cancer risk. These factors fail to explain why some of the body’s tissue types are more likely to develop cancer than others even in cases where hereditary and environmental risks are equal. For example, tissues of the small and large intestine are both susceptible to cancer caused by mutations in the APC gene, which regulates the production of the APC protein, a tumor suppressor that keeps cells from dividing in an uncontrolled way. The small and large intestines are presumably exposed to the same environmental factors, and yet cancer of the colon (part of the large intestine) is far more common than cancer of the duodenum (part of the small intestine). In this study, researchers investigated how a third factor—chance genetic mutations that occur during stem cell division—may contribute to the overall rate of cancer incidence in each tissue. The researchers plotted data from previously published studies to determine whether tissues with a greater number of stem cell divisions (and therefore a greater amount of DNA replication) over a person’s lifetime is related to the overall risk of cancer in that tissue.