

Researcher responds to study claims that cancer risk is a matter of luck

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The journal *Science* published a statistic-laden research article last month that garnered far more attention than most such pieces usually do. In it, the authors made a provocative claim: two-thirds of the variation of cancer risk among different types of tissues can be attributed to random mutations – in other words, "bad luck." That meant that the other two major drivers of cancer—heredity and environment—account for only one-third of the variation.

Carolyn Gotay, a professor in the School of Population and Public Health at UBC and the Canadian Cancer Society Chair in Cancer Primary Prevention, take issue with the findings. Gotay and her colleagues, Professor John Spinelli and Associate Professor Trevor Dummer, wrote a letter to the journal, which is published today. In the letter, Gotay discusses her objections to the article, and her fear that it may lead people to become fatalistic about [cancer](#).

What is the basis for the authors' claim?

It was an interesting statistical relationship, based on rates of stem [cell division](#), and how many mutations happen in the course of stem cells multiplying. But they over-interpreted their calculations by implying that a causal relationship exists between cell division and cancer rates. Emerging evidence shows that cell division rates and genetic "errors" are not simply the result of time and chance, but can be affected by external factors, such as obesity, pollution, infections and inflammation.

What are some of their most objectionable conclusions?

Some of their findings simply don't reflect current evidence about cancer. For example, the authors say that "R-tumour" [types of cancer](#) are unlikely to be preventable. But scientists have found strong links between modifiable risk factors and cancer incidence for a number of cancers considered to be "R-tumours" in the paper – such as tobacco and alcohol use for esophageal and head and neck cancers, radon exposure for [lung cancer](#), and ultraviolet light exposure for melanoma. The authors also didn't consider the two most common type of cancers – breast and prostate. So I believe that they over-interpreted their results.

What evidence do you have to "make the case" that environment plays a major role in cancer?

Scientists have shown a variation in cancer incidence rates for the "R-tumour" types of cancers that correlate with where people live. They have also shown that [cancer rates](#) vary over time, which would not be the case if most of them were caused by [random mutations](#).

So you don't believe there is any reason to let our guard down when it comes to minimizing cancer risk?

Absolutely not! There are many actions we can take to lower our risks of cancer – such as not smoking, maintaining a healthy weight, staying active, and eating well. Given that there are lots of things in life that we can't control, why not take charge for those things we can?

More information: "Cancer risk: Prevention is crucial." *Science* aaa6462. [DOI: 10.1126/science.aaa6462](https://doi.org/10.1126/science.aaa6462)

"Variation in cancer risk among tissues can be explained by the number of stem cell divisions." *Science* 2 January 2015: Vol. 347 no. 6217 pp. 78-81 [DOI: 10.1126/science.1260825](https://doi.org/10.1126/science.1260825)

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