

A grape constituent protects against cancer

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"We observed a 45 percent decrease in tumor load," explains Muriel Cuendet, Associate Professor in the School of Pharmaceutical Sciences of the UNIGE Faculty of Science. Credit: UNIGE

Lung cancer is the deadliest form of cancer in the world, and 80 percent of death are related to smoking. In addition to tobacco control, effective chemoprevention strategies are therefore needed. A team of scientists from the University of Geneva (UNIGE), Switzerland, studied a well-known natural product, resveratrol, which is found in grapes and in red

wine. While its chemopreventive properties against cancers affecting the digestive tract have been documented by previous studies, resveratrol has so far shown no effect on lung cancers. Thanks to nasal administration, the UNIGE team obtained very promising results in a study conducted in mice and described in the journal *Scientific Reports*.

We tried to prevent [lung cancer](#) induced by a [carcinogen](#) found in cigarette smoke by using [resveratrol](#), an already well-documented molecule, in a mouse model," explains Muriel Cuendet, associate professor in the School of Pharmaceutical Sciences of the UNIGE Faculty of Science. This 26-week-long study compared four groups of mice. The first one, the control, received neither carcinogen nor resveratrol [treatment](#). The second received only the carcinogen, the third received both the carcinogen and the treatment, and the fourth received only the treatment. "We observed a 45 percent decrease in tumor load per mouse in the treated mice. They developed fewer tumors and of smaller size than untreated mice," says Cuendet. When comparing the two groups that were not exposed to carcinogen, 63 percent of the mice treated did not develop cancer, compared to only 12.5 percent of the untreated mice. "Resveratrol could therefore play a preventive role against lung cancer," she continues.

This formulation is applicable to humans

However, resveratrol does not seem suitable for preventing [lung](#) cancer: When ingested, it is metabolized and eliminated within minutes, and therefore does not have time to reach the lungs. "This is why our challenge was to find a formulation in which resveratrol could be solubilized in large quantities, even though it is poorly soluble in water, in order to allow nasal administration. This formulation, applicable to humans, allows the compound to reach the lungs," explains Aymeric Monteillier, a scientist in the School of [pharmaceutical sciences](#) of the UNIGE Faculty of Science, and the first author of the study.

The resveratrol concentration obtained in the lungs after nasal administration of the formulation was 22 times higher than when taken orally. The chemoprevention mechanism is probably related to apoptosis, a process by which cells program their own death and from which cancer cells escape. The UNIGE research team will now focus on finding a biomarker that could contribute to the selection of people eligible for preventive treatment with resveratrol.

Resveratrol is a well-known molecule found in food supplements, meaning that no further toxicological study would be needed prior to commercialisation as a preventive treatment. "This discovery is unfortunately of little economic interest to pharmaceutical groups. The molecule is indeed simple and non-patentable and [cancer](#) prevention studies require a follow-up over many years," regrets Muriel Cuendet, without excluding the development of [preventive treatment](#) in humans.

More information: Aymeric Monteillier et al. Intranasal administration of resveratrol successfully prevents lung cancer in A/J mice, *Scientific Reports* (2018). [DOI: 10.1038/s41598-018-32423-0](https://doi.org/10.1038/s41598-018-32423-0)

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