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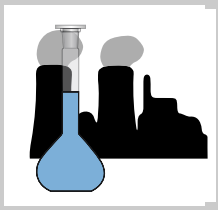

Highlights of Analytical Sciences in Switzerland

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Radionuclides in Human Hair of Swiss People

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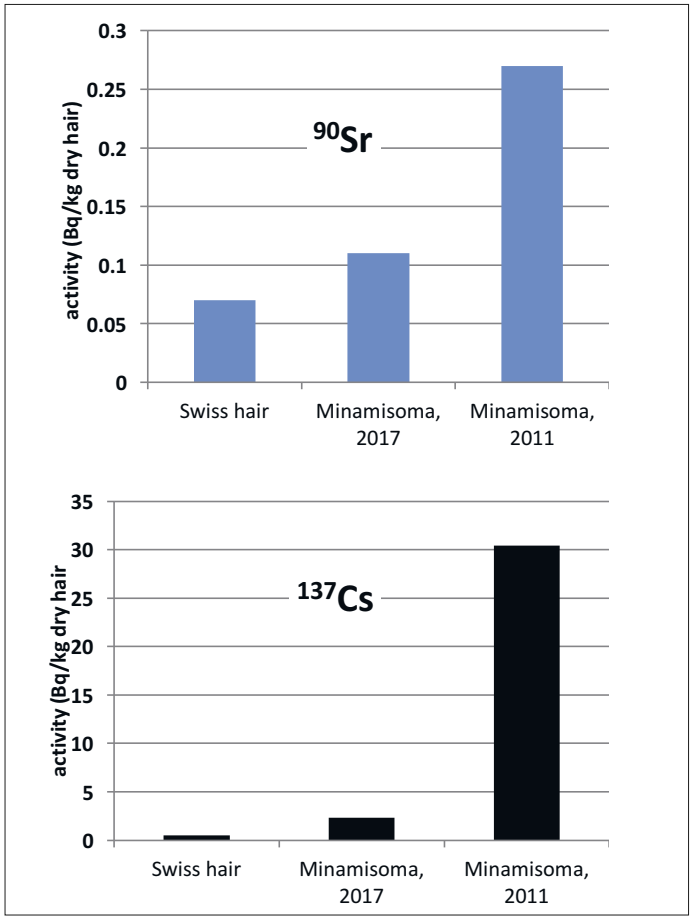
Radiocaesium (^{134}Cs and ^{137}Cs) and radiostrontium (^{90}Sr) belong to the radionuclides, which are emitted to the environment when nuclear fission gets out of control. Their main source is from bomb fallout, when over 600 bombs were tested in the atmosphere from 1945 to 1970. Additionally, they originate from nuclear accidents, such as the reactor fire at the nuclear power plant (NPP) of Chernobyl or the core melting of three reactors at Fukushima Dai-ichi in 2011. In Switzerland, the fallout from bomb tests and from the Chernobyl reactor-fire contributes to the internal dose mainly by consumption of food.



Mean activities in hair from Swiss people compared to contaminated Japanese hair from the exclusion zone of Fukushima Dai-ichi.

One possibility to investigate these internal doses is by whole-body counting (mainly gamma rays are detectable) or analysing urine and faeces. Scientists often use the analyses of teeth or bones to estimate the amount of incorporated radiostrontium. The analysis of hair offers another approach. Hair is a common matrix to test for drug abuse or for intoxications (*e.g.* with a toxic metal). Yet, little is published about hair analysis for the determination of radio contamination in man.

In 2017, we investigated the pooled hair samples collected by hairdressers of the city of Basel and surrounding villages. The hair was washed with detergents and water. After drying the hair, it was ashed at 600 °C. The ashes were analysed with gamma spectrometry (radiocaesium). Then, after several clean-up steps, the extracts were analysed with beta spectrometry (radiostrontium).

We compared the results to human hair of Japanese people from Minamisoma City (a town in the exclusion zone of the NPP Fukushima Dai-ichi) collected by a hairdresser in 2011 and 2017.

Today, the Swiss hair show little radio contamination. While the hair from Japanese people who were exposed directly to the fallout from the NPP Fukushima Dai-ichi showed significantly higher contamination. Seven years after the NPP accident, the radio contamination of the hair dropped to about 10% (^{137}Cs) and 30% (^{90}Sr), respectively, of the original contamination level.

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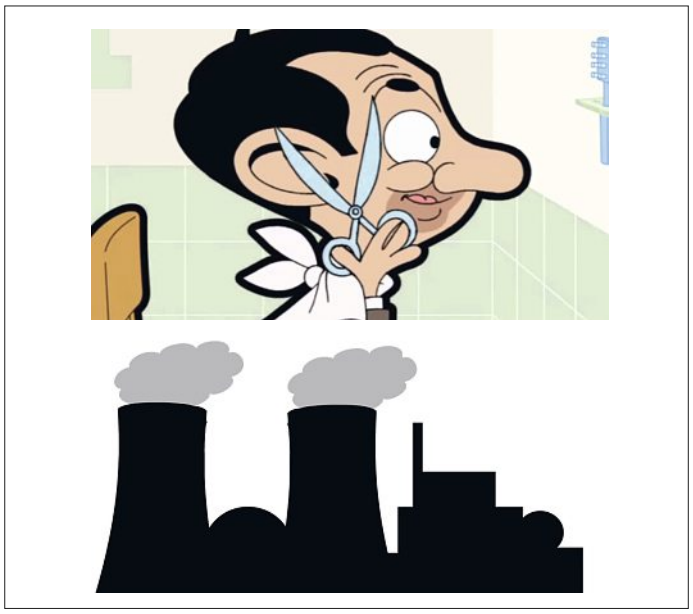

Radioactive fallout, which is incorporated with food and *via* air, is deposited in human hair to some extent.

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