

A promising approach in isotope geochemistry: $^{87}\text{Sr}/^{86}\text{Sr}$ in human teeth and hair to study dietary and environmental effects.

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In recent years Sr isotope geochemistry has provided a huge contribution to environmental and food traceability studies. This is possible because soils, plants and water are characterized by a particular Sr isotopic signature ($^{87}\text{Sr}/^{86}\text{Sr}$ ratio), which derives from the local geological substratum which, in turn, depends on geological processes and on the age and initial rubidium content of the rocks, given that ^{87}Rb decays to ^{87}Sr over time. Strontium ions, released upon weathering of the rocks, or exchanged through the interaction between rocks and circulating waters, enter the ecosystem, accumulating in waters and soils, and constitute the reservoir of bioavailable Sr. Since the relative abundance of Sr isotopes does not change during the path through the food chain, the $^{87}\text{Sr}/^{86}\text{Sr}$ ratio in human tissues reflects that of the environment in which people lived. In particular, tooth enamel (which forms during the first years of life) does not exchange with external Sr after mineralization. For this reason, its isotopic composition mostly reflects the $^{87}\text{Sr}/^{86}\text{Sr}$ of the food intake that individuals use for energy, growth and maintaining the processes of life, and in part reflects the place where the individual spent his or her childhood. On the other hand, because of the continuous supply of Sr from nutrition, the $^{87}\text{Sr}/^{86}\text{Sr}$ of hair reflects the adult diet and can possibly account for the health status of the individual of the last few years, besides environment where he/she lives.

In this work, a Sr isotopic characterization of both deciduous human teeth and, for the first time in Italy, human hair was carried out. Donors are almost all born and currently residing in Campania (Southern Italy), of different age, sex, and health status. The $^{87}\text{Sr}/^{86}\text{Sr}$ of deciduous teeth provides a direct link to the mother's milk, which is the first food for the majority of individuals. This latter in part is related to the local geological substratum and in part to the diet that has become no longer local, but global. The $^{87}\text{Sr}/^{86}\text{Sr}$ ratio of hair clearly reflect the change in diet with growth, and the possible effects of pathologies, cosmetic treatments and medicines.