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South Tyrol Museum of Archaeology



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Press Information

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Cardiovascular examination of Ötzi

Radiological study by Bozen-Bolzano Hospital published

Ötzi the Iceman, who was probably 46 years old when he died, had three areas of calcification in his coronary vessels. This is the conclusion that a team led by radiologist Patrizia Pernter from Bozen-Bolzano came to. The results of the investigation were published in the scientific journal “RöFo – Fortschritte auf dem Gebiet der Röntgenstrahlen” (the official organ of the German and Austrian Radiological Societies)*. The extent of atherosclerosis is comparable with that of a 40 to 50 year old light-skinned man of today. As Ötzi’s life-style was not predominantly sedentary, the authors conclude that a genetic predisposition was an important trigger for arteriosclerosis.

Up until 2013 it had not been possible to carry out a complete computer tomographic scan of Ötzi, due to the well-documented outstretched position of his arm. Only after new CT scanners with a wider gantry opening were made available for patients was it possible to scan the Iceman in one single pass through the machine in the Central Hospital in Bozen-Bolzano. This led to the first ever images of Ötzi’s entire thoracic region, which were subsequently examined by Patrizia Pernter, Beatrice Pedrinolla and the former head of the Radiology Department in Bozen-Bolzano Hospital, Paul Gostner.

In their analysis of the chest area they immediately noticed three calcifications in the region of his heart. The team of doctors then made a comparison with other regions of the body where calcification is frequently observed and this confirmed their conclusion: calcifications could also be detected for instance in the region around Ötzi’s carotid artery and in the arteries at the base of his skull.

The evidence of calcifications in the CT scan was quantified using a measuring system which is based on the density and volume of the calcifications. It needs to be borne in mind that these measurements give different results between ethnic groups, gender and age. For Ötzi, the comparative values for Caucasians (i.e. light-skinned people) were used, as defined by Agatston, who developed the method.

“If calcium is detected, this means that arteriosclerotic plaques are present. If one were to apply the calcifications to the heart of a living person, then the values found in Ötzi would correspond to those of an approximately 45 year old man with light skin,” is how Patrizia Pernter explains the medical results for the Iceman. She then goes on to speculate what this might have meant for Ötzi’s future life or what it actually means for people of a similar age today. “The presence or absence of calcium deposits can be of value when calculating the cardiovascular risks for a patient; that is to say, in addition to other risk factors (blood lipids, smoking, raised blood pressure, diabetes etc.) the presence of coronary calcifications can be a further indication of increased risk of having coronary heart disease or of developing it in the future.”

In 2012 the Iceman’s genome was published and it was established then that he had a genetic predisposition to cardiovascular diseases. For Patrizia Pernter there is no doubt that the mummified Ötzi is not only one of the oldest observed cases of vascular calcification, but is also “a medical example showing that a genetic predisposition is probably the most important trigger factor for arteriosclerosis and coronary heart disease”.

* RöFo Fortschritte auf dem Gebiet der Röntgenstrahlen und der bildgebenden Verfahren 2018; 190:61-64

Interview with Dr Patrizia Pernter: secretariat of the Radiology department, Central Hospital Bolzano-Bozen, L. Böhlerstr. 5, 39100 Bolzano-Bozen/Italy, phone +39 0471 908494

Photo: interactive Iceman multimedia station with touchscreen © South Tyrol Museum of Archaeology / O. Verant

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