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## Biomineralogy of skin cancer carcinoma basocellulare solidum

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Studies on Carcinoma basocellulare solidum were carried out using histological and mineralogical methods, mainly SEM and EDS chemical analysis of tumor tissues. The studies were conducted in an unconventional way, using an electron beam to analyze deparaffinized histological samples of about 20-25 μm thickness. Acquired results prove that this research technique is fully useful in identifying the degree of mineralization in tumor tissues. All the examined samples contained tissue with varying stages of neoplastic process affected by mineralization to a bigger or smaller degree, or represented healthy tissues as comparison. We have not studied tissues representing the earliest stage of the cancer, because tumors at this stage are often elusive. Different tissue structures were observed in healthy tissues vs. tumor tissues. In the latter, mostly fibrous or gritty, and sometimes grainy structures were present, which were not observed in normal tissues. This is probably at least partially connected to a different kind of mineralization occurring in tumor tissue than in healthy tissue. It has been observed that the structures of tumor tissues are more sensitive to testing in vacuum (scanning) than healthy tissues, which means that they are less durable. Tumor tissues, in comparison to healthy tissues, show uneven distribution of elements. Concentrations of mineral micro-grains are present. They are changeable and mineralized with different elements, especially calcium but also, to a lesser extent, phosphorus, sulfur and others. In tumor tissue, there is usually slightly more calcium and potassium. Compared to the quantity observed in control samples, tumor tissues almost completely lack magnesium, and often also sodium. The level of mineralization in tumor tissues appears to be less dependent on the age of the patient, and more on the advancement of cancer. In the first stage, mineralization in the tumor region is hidden and does not manifest as grains, but rather as increased quantities of elements in the tissues. That means that elements such as calcium, phosphorus and sulfur get built into the biological structures of tissues. Hidden mineralization may or may not transform into visible concentrations of micro-grains. Those grains are up to 10.0 μm in size and are usually located near cells. Observations of the correlation between calcium and phosphorus indicate that the mineral grains represent either calcium phosphates or calcium carbonates. Completed studies show that tissue mineralization may or may not increase as the cancer grows. Due to intense metabolism of cancer cells, there may be excess of carbon dioxide in tissues, which leads to local acidification of the tumor tissue. That phenomenon is not conducive to mineralization. However, when the environment changes to alkaline even for a short time, local mineralization may set in and calcification may occur.

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