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Microcalcification as an active phenomenon mediated by epithelial cells with mesenchymal characteristics

Elena Bonanno

Università di Roma Tor Vergata, Italy

Mammary microcalcifications have a crucial role in breast cancer detection, but the processes that induce their formation are unknown. Moreover, recent studies have described the occurrence of the epithelial–mesenchymal transition (EMT) in breast cancer, but its role is not defined.

Elemental analysis of microcalcifications by EDX revealed that the complex formation of calcium hydroxyapatite was strictly associated with malignant lesions whereas calcium-oxalate is mainly reported in benign lesions. Morphological studies demonstrated that epithelial cells with mesenchymal characteristics were significantly increased in infiltrating carcinomas with microcalcifications and in cells with ultrastructural features typical of osteoblasts close to microcalcifications. These data were strengthened by the rate of cells expressing molecules typically involved during physiological mineralization (i.e. BMP-2, OPN) that discriminated infiltrating carcinomas with microcalcifications from those without microcalcifications.

Although the phenomenon of breast microcalcifications could be sustained by several mechanisms, the finding of osteoblast-like cells led us to hypothesize that microcalcifications in breast lesions could represent an active process related to epithelial to mesenchymal transition.

New insights into the complex phenomenon of breast microcalcification could better define the pathophysiology of different microcalcifications. The introduction of mesenchymal markers such as vimentin and elemental analysis of breast lesions with microcalcifications may add further data to complete the clinical setting in the diagnosis and care of patients. The finding of a specific elemental composition associated with microcalcifications in cancer could enhance imaging technologies to discriminate microcalcifications *in vivo*, and thus act as a helpful tool in breast cancer screening.

Biography

Elena Bonanno, MD, PhD; (medical school degree in 1984; PhD degree in 1990) aggregate professor of pathology at University of Rome Tor Vergata, actually in charge of Cytopathology and breast pathology at Tor Vergata University Hospital. She published more than 80 scientific papers, 4 chapters in book. She actively participate to the Italian group of breast pathology study (GIPAM).

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