Micronization of radiosenstive microcapsules using carbonate water, and their ability to detect and treat metastasis

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Abstract

We report on microcapsular imaging and therapy of micrometastasis using micronized microcapsule by carbonate water, which releases their core contents with response to radiation, via 2 radiotherapy sessions. In the first session, computed tomography (CT)-detectable microcapsules containing P-selectin antigen were intravenously injected to detect metastasis via antibody-antigen accumulation of αVβ3. The second session involved treatment of metastasis by carboplatin, released from microcapsules by radiation corresponding to P-selectin expression and P-selectin-P-SGL-1 antigen-antibody reactions.

The microcapsules were 0.52 ±0.029 μm (ϕ). Anti-αVβ3 microcapsules accumulated around metastasis sites and were detectable on CT. These microcapsules released P-selectin antigen in response to the first irradiation. In the second session, the microcapsules released carboplatin. The micronized microcapsules deposited more carboplatin, resulting in more reduction of metastases. However, they were not significantly different when compared with unmicronized microcapsules.