Comparison of therapeutic efficacy and biodistribution of 213Bi- and 211At-labeled monoclonal antibody MX35 in an ovarian cancer model

Abstract:
Introduction: The purpose of this study was to compare the therapeutic efficacy and biodistribution of the monoclonal antibody MX35 labeled with either 213Bi or 211At, both α-emitters, in an ovarian cancer model. Methods: One hundred female nude BALB/c (nu/nu) mice were inoculated intraperitoneally (i.p.) with human ovarian cancer cells (OVCAR-3). Two weeks later, forty of these mice were injected i.p. with ~2.7 MBq of 213Bi-MX35 (n=20) or ~0.44 MBq of 211At-MX35 (n=20). Four weeks after inoculation, new OVCAR-3-inoculated mice were injected with the same activities of 213Bi-MX35 (n=20) or 211At-MX35 (n=20). The presence of tumors and ascites was investigated eight weeks after therapy. Biodistributions of i.p-injected 213Bi-MX35 and 211At-MX35 were studied in tumor-free nude BALB/c (nu/nu) mice (n=16). Results: The animals injected with 213Bi-MX35 or 211At-MX35 two weeks after cell inoculation had tumor-free fractions (TFFs) of 0.60 and 0.90, respectively. The untreated reference group had a TFF of 0.20. The groups treated with 213Bi-MX35 or 211At-MX35 four weeks after inoculation both had TFFs of 0.25, and the reference animals all exhibited evidence of disease. The biodistributions of 213Bi-MX35 and 211At-MX35 were very similar to each other and displayed no alarming activity levels in the investigated organs. Conclusions: Micrometastatic growth of an ovarian cancer cell line was reduced in nude mice after treatment with 213Bi-MX35 or 211At-MX35. Treatment with 211At-MX35 provided a non-significantly better result for the chosen activity levels. The radiolabeled MX35 did not accumulate to a high extent in the investigated organs, and no signs of toxicity were observed.

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