

Imaging the interaction of α_v integrin-GFP in osteosarcoma cells with RFP-expressing host stromal cells in nude mice.

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Introduction

Host stromal cells are tightly associated with tumor progression and metastasis in cancer. However, little has understood in osteosarcoma. In order to understand the interaction between host and osteosarcoma cells during tumor progression, we report here real-time imaging of the interaction of GFP-expressing osteosarcoma cells and RFP-expressing host stromal cell in nude mice *in vivo* as well as collagen fiber.

Materials & Methods

143B human osteosarcoma cells expressing α_v integrin-GFP were generated by transfection with an α_v integrin-GFP vector. To observe the interaction between osteosarcoma and host cells, the α_v integrin-GFP expressing tumors were established in transgenic nude mice ubiquitously expressing red fluorescent protein (RFP) in the tibia orthotopically. Three weeks after transplantation, the primary tumors were passaged orthotopically in the tibia in non-colored nude mice, which maintained the RFP stroma. The interaction of α_v integrin-GFP expression in 143B cells with RFP-expressing host stromal cells was observed using confocal microscopy. Collagen fibers were imaged simultaneously in reflectance mode. Three RFP nude mice and five non-colored nude mice were used totally.

Results

The primary tumors acquired RFP-expressing stroma at three weeks after transplantation. The RFP-expressing stroma included cancer-associated fibroblasts (CAFs) and tumor-associated macrophages (TAMs) in the tumors which persisted even 3 weeks after passage. CAFs expressing RFP were aligned between collagen fibers and cancer cells expressing α_v integrin-GFP. Six weeks after passage, pulmonary metastases expressing α_v integrin-GFP could be identified. TAMs expressing RFP accompanied osteosarcoma cells expressing α_v integrin-GFP in the lung.

Discussion

α_v integrin linked to GFP and host stromal RFP allows the real-time imaging of the interaction between α_v integrin in osteosarcoma and host stromal cells during tumor progression. The present study demonstrates the importance of α_v integrin interaction with stromal elements in osteosarcoma.