Role of integrins and evidence for two distinct mechanisms mediating human colorectal carcinoma cell interaction with peritoneal mesothelial cells and extracellular matrix

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Peritoneal carcinomatosis involves a series of events including tumor cell interactions with mesothelial cells and the extracellular matrix (ECM). We have studied the adhesive and invasive properties of four human colorectal carcinoma cell lines (Co115, HT29, SW480, SW620) confronted in vitro with a human mesothelial cell monolayer or with the ECM proteins collagen IV, laminin-1, fibronectin, tenascin-C and vitronectin. Quantitation was achieved following staining of tumor cells with the calcein-AM fluorescent dye. We found that all four cell lines rapidly adhered to a mesothelial cell monolayer. This adhesion event was not inhibitable by anti-integrin and anti-CD44 antibodies. Following initial attachment, the SW480 and SW620 cells invaded the mesothelial cell monolayer more aggressively than HT29 and Co115 cells. All cell lines adhered to ECM proteins with each one exhibiting an individual adhesion pattern. Adhesion to matrix was completely integrin-dependent. When tested in an invasion assay, HT29 and Co115 cells crossed Matrigel-coated filters while SW480 and SW620 cells did not. This invasion was inhibited by anti-beta 1 integrin antibodies. Taken together, our results demonstrate that the initial colorectal tumor cell-mesothelial cell interaction occurs through an integrin-independent mechanism while adhesion to matrix proteins and invasion through Matrigel are integrin-dependent events. Furthermore, the different invasive capacity of SW480 and SW620 versus HT29 and Co115 cells upon interaction with a mesothelial cell monolayer or Matrigel suggests that these two invasion events may be mediated by distinct mechanisms.