Investigation of Interactions between SAOS-2 Osteosarcoma Cells and Endothelium

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INTRODUCTION
Metastasis of malignant tumour cells involves the passage of malignant cells across the vascular barrier.

We earlier reported that the osteosarcoma tumour cell line (SAOS-2) induced apoptosis in cultured human umbilical vein endothelial cells (HUVEC) in a contact-dependent manner (1), raising the possibility that contact-induced endothelial apoptosis may contribute to metastasis.

In separate as yet unpublished work, we have found that SAOS-2 undergo transient fusion events with fibroblasts and smooth muscle cells, but do not induce apoptosis in these non-endothelial cell types (2).

METHODS
HUVEC isolated by collagenase perfusion were used up to passage 5. HUVEC were co-cultured with SAOS-2 in 4% BSA and incubated up to 24 hours. HUVEC were labelled using UEA-1 lectin immunohistochemically. Direct counts of HUVEC were performed by light microscopy. DNA was isolated from cultures and run on 1% agarose gels.

RESULTS
Figure 1: Co-culture of HUVEC with SAOS-2 reduced the apparent culture density of UEA-1 positive cells over 24 Hrs (Bars 100 μm).

Figure 2: HUVEC culture density decreased rapidly especially within the first 4 hours (p<0.001).

Figure 3: Internucleosomal DNA fragmentation is a characteristic property of apoptosis.

Figure 4: Photomicrographs illustrating HUVEC and SAOS-2 co-cultures. Fused cells appear yellow in colour (g). HUVEC (a,b,c) and SAOS-2 (d,e,f), and merged images (g,h,i).

Figure 5: SAOS-2 fusion with endothelial cells, confirmed by Confocal Laser Scanning Microscopy. (Colocalization Index 0.62 in area 1 versus 0 in area 2)

CONCLUSION
The findings demonstrated that SAOS-2 cells induce apoptosis in HUVEC cells in a contact-dependent manner. Moreover, SAOS-2 cells fuse with HUVEC cells which might contribute to dissemination of tumor cells through metastasis.

It may be concluded that tumour-endothelial cell interactions exhibit a dynamic nature. These interactions may bring about apoptosis of endothelial cells or their fusion with tumour cells, both of which may contribute to metastatic properties of tumour cells through intra- and extravasation.

REFERENCES


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1. Ministry of National Education, Republic of Turkey.

2. Bela Schwartz Foundation, Australia.