ETM* Is Indispensable to Endothelial Cell Physiology during Pathological Angiogenesis

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Angiogenesis is requisite for the growth and metastatic spread of solid tumors. Identifying pathological angiogenesis regulators will provide therapeutic targets against solid tumor growth. This study's aims were 1) to identify the role Etv2 Target M* (ETM*) in endothelial cell (EC) physiology during angiogenesis, and 2) to assess ETM's* potential as a therapeutic target against tumor angiogenesis in vitro. Analysis of NCBI GEO microarray data revealed ETM* dysregulation during breast ($p<0.0001$), colon ($p<0.001$), and renal cancer ($p<0.01$), suggesting ETM* may regulate tumor angiogenesis. Hallmark angiogenic endothelial functions—proliferation, migration, sprout formation, and tube formation—were quantified in ETM* knockdown (KD) ECs. Boyden chamber and proliferation assays in ETM* KD ECs revealed a 3-fold decrease in migration ($p<0.0001$) and 20% decrease in proliferation rate ($p<0.0001$). Wild-type ECs formed 4 times the number of angiogenic sprouts with a 2:1 length ratio compared to ETM* KD ECs ($p<0.0001$). Additionally, ETM* KD ECs were incapable of forming vascular networks in vitro. Deficient migration, proliferation, sprout formation, and tube formation in ETM* KD ECs highlights ETM's* role during angiogenesis. Remarkably, tumor spheroids co-cultured with ECs as an in vitro model for tumor angiogenesis showed ETM* KD ECs could not form vasculature towards tumors unlike wild-type ECs. ETM* is, therefore, indispensable to endothelial physiology during tumor angiogenesis. Future investigations are required to identify a safe and efficient delivery mechanism for ETM* siRNA as an anti-angiogenic therapy which may curtail the life-threatening effects of solid tumors.

Awards Won:

First Award of $3,000

National Anti-Vivisection Society: Third Award of $2,500

Serving Society Through Science: First Award of $1000