Investigation of Human Placental Aspartic Proteases Ability to Generate Anti-angiogenic Molecules

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**Introduction:** The proteases play essential roles in human placenta throughout pregnancy like angiogenic and vascular remodeling processes. Placental proteases have shown the ability to establish their own regulatory mechanism of placentation and some of these processes are mediated by inhibitors of angiogenesis. Studies show that besides the metallo-proteases, other proteases can generate inhibitory molecules. Cathepsin D, an aspartic protease, is capable of generating anti-angiogenic fragments by the cleavage of plasminogen and also prolactin. Its expression in the placental tissue has been associated with the uteroplacental development and tissue function. A change in the gene expression profile of this protease may play a role in abnormal placentation, similar to that seen in preeclampsia. Thus, investigating aspartic proteases from human placental tissue may contribute to a better understanding of placental angiogenesis and pathological implications. **Methodology:** The term placenta was perfused with saline and processed with buffer containing a protease cocktail of inhibitors. This extract was subjected to affinity chromatography with Pepstatin A-agarose ® and then to a column HiTrap\(^{TM}\)Blue HP. The affinity-purified fraction was incubated with plasminogen, subjected to SDS-PAGE followed by western blot. **Results and Discussion:** The aspartyl proteases eluted from the extract have shown to be able to cleave plasminogen and release fragments with approximately 40kDa which were recognized by antibody anti-angiostatin. Further experiments are in progress to determine if fragments recognized can inhibit angiogenesis in a HUVEC angiogenic cells model. **Conclusion:** The plasminogen can be processed by placental aspartic proteases generating fragments that may have angiostatin-like function, acting as angiogenesis inhibitors.

**Keywords:** angiogenese, placenta, proteases

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