Use of ADAM 12 for diagnosis and therapy of preeclampsia (P-600)

Key Facts
- Simple diagnosis method for preeclampsia using blood sample
- Easy handling ELISA test to develop
- Development of therapeutic drug against preeclampsia possible

Background:
Preeclampsia is a disorder affecting about 5% of pregnant women. It becomes manifest in the last trimester of pregnancy and is characterized by high blood pressure, protein in the urine, and, sometimes, edema of the face and hands. When left untreated, preeclampsia can lead to severe problems, endangering both mother and fetus. High blood pressure constricts the blood vessels in the uterus that supply the fetus with oxygen and nutrients. Fetal growth is retarded. Preeclampsia can increase the risk of:

- placental abruption
- kidney failure
- cerebral hemorrhage
- intravascular coagulation
- lung edema
- circulatory collapse

Untreated preeclampsia can lead to eclampsia, a life-threatening condition that can result in convulsions and coma. HELLP syndrome, intrauterine growth retardation, and gestational diabetes are also often considered to be associated with preeclampsia.

Often the symptoms of preeclampsia cannot be controlled. Diagnosis of preeclampsia can arise late since the symptoms, once discovered, are used in order to make the diagnosis. There is an urgent need for molecular markers indicative of preeclampsia. Most prospective markers found thus far are only weakly up- or downregulated in preeclampsia or can only be measured in placental tissue. Because women experience no symptoms in the early stages of preeclampsia, reliable diagnosis is needed. The nucleic acid sequence related to preeclampsia could also be used in the manufacture of a medicament for the treatment of preeclampsia.

The Technology:
The researchers’ studies revealed a significant role of ADAM 12, ADAM 12-L and ADAM 12-S in preeclampsia and related disorders. ADAM 12 (meltrin alpha) is a member of the ADAM (a disintegrin
ADAM 12 has been implicated in cell adhesion and muscle cell differentiation and fusion, as well as fat tissue development. It is also upregulated in several types of human carcinomas. Although it is already known that ADAM 12-S is expressed highly in the placenta, no connection of ADAM 12, particularly ADAM 12-S, to preeclampsia has previously been reported.

Due to the researchers’ findings for ADAM 12, inhibiting or reducing expression or biological activity of ADAM 12 could provide a treatment for preeclampsia.

Using ADAM 12, a simple diagnostic assay (e.g. ELISA) can be developed against preeclampsia syndrome and related diseases.

Applications:
Diagnosis and treatment of preeclampsia and similar disorders

Intellectual Property
European and US applications on file

Development Stage:
Identification of ADAM 12 by microarray analysis. Verification studies completed with RT-PCR, real-time PCR, in situ hybridisation on placental tissues of different gestational age, Western Blot on maternal plasma samples, age-matched for gestational age.

Next Steps:
Development of a monoclonal antibody
Screening of patient plasma samples, clinical studies.

Commercial Opportunity
We are seeking a licensing and/or collaboration partner to further the development of this technology into a beneficial product.

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References:
(1) “Preeclampsia: Increased Expression of Soluble ADAM12”; Sabine Gack et al. Journal of Molecular Medicine, 2005, in press


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