Case #489

oxLDL: A Biomarker and Therapeutic Target for Early Onset Preeclampsia Brain Injury

Major morbidity and mortality associated with preeclampsia occurs as a result of brain injury and neurological complications, such as seizure, and occur more often in early onset preeclampsia (EPE). Researchers at UVM have identified a biomarker that arises in women with EPE and has been shown to increase both blood brain barrier (BBB) permeability and brain inflammation in pregnant mice. The oxidative stress of EPE, combined with pregnancy induced hyperlipidemia, increases circulating oxidized LDL (oxLDL), which disrupts the BBB via LOX-1 binding and the subsequent generation of peroxynitrite. Identifying those women with high ox-LDL would help identify those at highest risk for brain injury and ensure prompt treatment with $MgSO_4$. In addition, therapeutic compounds targeting LOX-1 may be able to more specifically treat this condition without the side effects of $MgSO_4$.

Applications:

- Identification of women at high risk of preeclampsia brain injury
- Target for more specific and efficacious preeclampsia drugs.

Advantages:

- Use of oxLDL levels will identify those women at highest risk of EPE brain injury.
- Simple and noninvasive blood test.
- Assessment occurs at an actionable timeline.
- Could reduce use of $MgSO_4$ in women without risk of EPE brain injury.
- Targeting LOX-1 therapeutically may both reduce inflammation and BBB permeability.

Intellectual Property and Development Status:

US Patent No. 9,568,487 and US Non-Provisional US20170121407A1
Looking for research and development partners for diagnostic validation and compound development, as well as licensing partners.

References:

Increased oxidized low-density lipoprotein causes blood-brain barrier disruption in early-onset preeclampsia through LOX-1 FASEB J. 2013 Mar;27(3):1254-63

Cerebrovascular Dysfunction and Blood–Brain Barrier Permeability Induced by Oxidized LDL are Prevented by Apocynin and Magnesium Sulfate in Female Rats. J Cardiovasc Pharmacol Volume 63, Number 1, January 2014

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