

## **Placental exosome in maternal circulation for the identification of Bart's hydrops fetalis**

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### **Objective**

The objectives of this study are to determine whether: 1) placenta-derived exosome is elevated; and 2) exosome proteomics profile is differentially expressed in women with Bart's hydrops fetalis fetuses compared to normal pregnant women.

### **Methods**

A prospective cohort multi-center study in pregnant women couple at risk for Hb Bart's hydrops fetalis at 11 weeks' gestation onwards was conducted. Participants were classified into 3 groups: 1) non-Bart hydrops thalassemia conditions (n=5); 2) Hb's Barts hydrops fetalis (n=5); and 3) pregnant women at risk of placental associated complications (control group) (n=5). Gestational ages at blood sampling among the group were matched. Plasma exosomes were isolated by size exclusion chromatography and then collected exosome fractions. The exosomes were measured size and number of particles. Isolated exosomes and their plasma were measured PLAP level using Human Alkaline phosphatase (ELISA kit). Mass spectrometry was used to determine placental exosome proteomics profile.

### **Results**

Placental exosome concentration was significantly higher in women with Bart's hydrops fetalis compared to those without Bart hydrops or those with placental associated complications group. Several proteins were differentially expressed in women with Bart hydrops fetus. These proteins involved in immune response, vesicle mediated transport and complement activation.

### **Conclusion**

This is the first study of placenta-derived exosome for the identification of women with Hb Bart's hydrops fetalis. The result of this study is very important and it can be used to determine whether placental exosome in maternal circulation can be used as a non-invasive prenatal test for the early identification of Bart's hydropic fetus. This will ultimately reduce the rate of unnecessary invasive prenatal diagnosis testing.