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# Medical Case Reports

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### Maternal-fetal transport of L-leucine in pre-eclamptic pregnancies *in vitro*

**Introduction:** Previous reports from our laboratory had shown that maternal-fetal transport kinetics of model nutrients and reference markers were altered in toxemia model placenta *in vitro*. This study was meant to explore whether transport kinetics of a model amino acid L-Leucine were altered in placenta from pre-eclamptic pregnancies *in vitro*.

**Methods:** Human placenta from pre-eclamptic pregnancies were collected post-partum. <sup>14</sup>C labeled L-leucine (specific activity: 54 uCi/mmol, Amersham, UK) along with tritiated water (specific activity 5 mCi/mmol, Amersham, UK) as reference marker were then injected as a single bolus (100 ul) into the maternal arterial circulation of perfused placental lobules and perfusate samples collected from maternal and fetal circulations over a period of 5 minutes. National Culture and Tissue Collection medium, diluted with Earle's buffered salt solution was used as the perfusate. Concentration of labeled substances in perfusate samples in control and toxemia model perfusion phases was assessed by scintillation spectrometry (LKB Wallac Scintillation Spectrometer, Denmark) using pre-adjusted double window counting. Transport kinetics of substances studied was computed using established permeation parameters.

**Results:** Differential transport rates of L-leucine and tritiated water in 8 perfusions differed significantly (Student's t-test;  $p < 0.05$ ) for all transport fractions studied in control perfusions and perfusions from three pre-eclamptic pregnancies. Transport Fraction index of L-leucine compared to reference marker averaged 35.2% in control perfusions ( $n=8$ ) and 22.20% in perfusions from pre-eclamptic pregnancies ( $n=3$ ) respectively. The difference observed in TF index of L-leucine in control and study groups was statistically significant (Student's t-test,  $p < 0.05$ ) Indices of transport fraction and certain pharmacokinetic parameters such as area under the curve, absorption rate, elimination rate of deoxy glucose compared to reference marker were significantly different ( $p < 0.05$ ) between control and pre-eclampsia groups. Absorption rate: Elimination rate indices of model amino acid differed significantly between control and study groups (Student's t-test;  $p < 0.05$ ).

**Conclusions:** Our studies show for the first time that transport behavior of a model amino acid leucine is compromised in pre-eclamptic pregnancies and that the altered behavior of placental membrane in amino acid transport in such pregnancies has the potential to cause undesirable sequelae for the fetus and neonate.

### Biography

Moorkath Nandakumaran Obtained Doctorate Degree in Reproductive Physiology from University of Paris VI in the year 1979 and later did post-doctoral training as a Research Consultant for about 4 years at the famous St Vincent de Paul Hospital, Paris in field of Biochemical Pharmacology. He is currently Professor in Obstetrics & Gynecology Department of Kuwait medical Faculty, Kuwait University. Dr Nandakumaran specializes in research relating to maternal-fetal exchange of nutrients and drugs in control and disease state including pre-eclampsia and diabetes mellitus, using isolated human placental perfusion technique as well as using experimentally induced diabetic rats. Has published nearly 100 research papers and presentations in international scientific journals and conference proceedings and has been Invited Speaker in many International Conferences.

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