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**Impact of maternal iron deficiency anaemia on the expression of the newly discovered multi-copper ferroxidase, Zyklopen, in term placentas**

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**Abstract**

In the present study, we investigated the effect of maternal iron deficiency anaemia (IDA) on expression of the newly discovered iron transporter, Zyklopen in term placenta, in 200 pregnant women. Placental expression of Zyklopen was studied by mRNA analysis and immunohistochemistry for the protein. In addition neonatal anthropometric parameters were also analysed. 58.8% of 200 subjects were anaemic. Both Zyklopen mRNA as well as protein expression in the placenta showed a statistically significant increase with increasing severity of anaemia. Although all the neonatal anthropometric parameters were lower in newborns of anaemic mothers, none showed any statistical significance. Zp mRNA levels did not show any significant correlation with newborn and placental parameters (except newborn skinfold thickness and head circumference). Similar to mRNA expression, Zp IHC expression correlated positively, albiet non-significantly, with newborn length and Hb levels, the correlation was however negative with birth weight, head circumference, mid-arm circumference unlike the mRNA expression, where it positively correlated with the above parameters. Our study for the first time demonstrated a definite increase in expression of Zyklopen at both mRNA and protein levels in term placenta, in maternal IDA.IMPACT STATEMENT**What is already known on this subject?** Iron deficiency anaemia (IDA) in a pregnant mother can lead to anaemia in the developing foetus; which is frequently observed to be of lesser severity than that in the mother. Recently a copper-containing oxidase called Zyklopen was discovered which was involved in iron efflux in BeWo cells. The gene encoding Zyklopen has been identified with a putative C-terminal membrane-spanning sequence and high sequence identitical to hephaestin (Heph) and ceruloplasmin (Cp), the other known vertebrate multicopper ferroxidase (MCF). Protein expression of this new MCF was observed in multiple diverse mouse tissues, including placenta and mammary gland.**What do the results of this study add?** Zyklopen protein immunohistochemical expression showed a statistically significant increase with increasing severity of anaemia. Similarly, placental mRNA expression of the Zyklopen gene was observed to be higher in anaemic mothers when compared to non-anaemic mothers. Our study for the first time demonstrated a definite increase in expression of Zyklopen at both protein and mRNA levels in term placenta, in maternal IDA.**What are** the **implications of these findings for clinical practice and/or further research?** This study will help us to understand better, the increased potential for influx of iron from mother to foetus in the condition of maternal iron deficiency. This study will help to determine how placental iron transport proteins can be regulated in response to maternal and neonatal iron status and will further our existing knowledge on relationships between maternal and neonatal iron status and mechanisms by which placental iron transport is modified in relation to these parameters.

**Keywords:**Maternal medicine; basic science; fetal medicine.