Long-term effects of differences in fetal environment: endocrine influences on cognitive function and personality in teen monozygotic twins

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Conclusion
Endocrine parameters are closely linked to differences in personality and quality of life in adolescent monozygotic twins. Results also suggest an impact on cognitive function. Birth-weight differences did not result in intra-twin differences regarding cognitive function and hormone levels during/after puberty.

Background
Low birth-weight (bw) and unfavourable intrauterine are associated with long-term effects on life. While influencing longitudinal growth and weight development, psychiatric and metabolic difficulties in later life have also been reported.

Methods
46 pairs (21 female) of monozygotic twins with intra-twin bw-differences (birth data available for all)
- differentiation between donators (lower birth weight) and acceptors (higher birth weight)
42 pairs during/post puberty 15.0 years (SD 1.0)
- endocrine parameters (fasting blood draw) – 37 pairs
- psychological questionnaires – 38 pairs
28 pairs after puberty 17.0 years (SD 1.0)
- cognitive function – 24 pairs
- psychological questionnaires – 28 pairs

Psychological questionnaires
- Strength and Difficulties Questionnaire1 (self- and parent-version)
- Kidscreen-52 – Health Related Quality of Life2 (QoL)
Cognitive function – Wechsler Adult Intelligence Scale3

Results I - Influence of birth weight differences
no significant correlation b/w bw SDS and cognitive function
no significant differences b/w donors and acceptors (paired t-tests) regarding
- cognitive function - descriptively slightly better scores for acceptors
- endocrine parameters
- psychological questionnaires (self- and parent-evaluation)

Results II - Endocrine parameters and IQ
negative correlation b/w TSH conc. and verbal comprehension

Results III - Endocrine parameters and psychological measures
positive correlation b/w estradiol conc. and self-perceived pro-social behavior
positive correlation b/w testosterone conc. and QoL self-perception, negative correlation b/w testosterone conc. and self-perc. emotional problems