Digital babies created to improve infant healthcare

Researchers at University of Galway, the Heidelberg Institute for Theoretical Studies (HITS) Heidelberg University, and Heidelberg University Hospital have created digital babies to better understand infants' health in their critical first 180 days of life. The international team created computer models that simulate the unique metabolic processes of each baby. The models can help to better understand rare metabolic diseases.

An international team of researchers at University of Galway, Ireland, the Heidelberg Institute for Theoretical Studies (HITS), and Heidelberg University Hospital (all Germany), have created digital babies to better understand infants' health in their critical first 180 days of life. The team created 360 advanced computer models that simulate the unique metabolic processes of each baby. The digital babies are the first sex-specific computational whole-body models representing newborn and infant metabolism with 26 organs, six cell types, and more than 80,000 metabolic reactions. The study was published in the journal *Cell Metabolism*.

Lead author Elaine Zaunseder, HITS and Heidelberg University, said: "Babies are not just small adults – they have unique metabolic features that allow them to develop and grow up healthy." Therefore, an essential part of this research work was to identify these metabolic processes and translate them into mathematical concepts that could be applied in the computational model.

For more details, see the press release of University of Galway.

About HITS:

HITS, the Heidelberg Institute for Theoretical Studies, was established in 2010 by physicist and SAP co-founder Klaus Tschira (1940-2015) and the Klaus Tschira Foundation as a private, non-profit research institute. HITS conducts basic research in the natural, mathematical, and computer sciences. Major research directions include complex simulations across scales, making sense of data, and enabling science via computational research. Application areas range from molecular biology to astrophysics. An essential characteristic of the Institute is interdisciplinarity, implemented in numerous cross-group and cross-disciplinary projects. The base funding of HITS is provided by the Klaus Tschira Foundation.

Publikation:
Zaunseder E et al: Personalized metabolic whole-body models for newborns and infants predict growth and biomarkers of inherited metabolic diseases. Cell Metabolism, 4 June 2024. (DOI: 10.1016/j.cmet.2024.05.006)
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Press release

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Further information

- Heidelberg Institute for Theoretical Studies (HITS)
- Press release of University of Galway