The Mab012 data product

Original number of samples	3,000
Number of samples (per 27.11.2023)	2,993
Number of unique participants	2,974
Biological sample type	Urine
Participant type(s)	MoBa mothers
Collection timepoint	Gestational week ~17
Case-control selection criteria	None
Biomarker type(s)	Nutritional, stress, renal and metabolic disease biomarkers
Original reference article	Kelsey *et al*. 2022
Analytical method(s)	Architect *ci*8200
Related MoBaBIO product(s)	Mab011, Mab013, Mab014, Pro003, Pro004
FHI Project number(s)	PDB1440

The project that generated these data

Norwegian Environmental Biobank, part I: The importance of nutritional status for the effect of heavy metals on the health of mothers and their children (MoBa-ETox)

Project lead: Line Småstuen Haug

This project formed the first part of the establishment of a Norwegian environmental biobank. The overarching goal of the Norwegian environmental biobank is to monitors levels of nutrients, environmental toxicants, and other unwanted substances in the body over time and examine how these substances affect our health. MoBa-ETox aims to obtain knowledge about nutritional and heavy metal status during pregnancy in the Norwegian Mother, Father and Child Cohort Study (MoBa), and to investigate what significance this may have for subsequent health outcomes in mothers and children. There will be a special focus on whether nutritional status can protect against the negative effects of unwanted environmental substances. The project uses biological samples and questionnaire data from the MoBa to analyze the amount of a selection of nutrients, essential elements and heavy metals in existing MoBa samples from the 2nd trimester of pregnancy, describe the results and assess these in relation to established recommendations and acceptable intakes, and investigate the importance of specific nutrients (vitamins and essential elements) and heavy metals for the risk of developing health problems in later life.

Study population

The original Mab012 biomarker data source is based on urine samples from **2,981 mothers** in MoBa who were pregnant in 2002-2008. Mothers were eligible for inclusion if they had completed questionnaires 1–6, if data were available from the father's questionnaire, if they had available blood and urine samples collected in pregnancy, and if they had genetic data available in MoBa. Mothers were ineligible for inclusion based on exclusion criteria applied for genotyping, which included participants who were not registered in the Medical Birth Registry, plural pregnancies, and pregnancies with children with autism, suspected autism, or symptoms of severe language delay. For a more detailed overview of the participant selection procedure in this study, refer to Caspersen *et al*. 2019.

Available biomarker measures (variable names in bold)

Albumin (**U-Alb-Mi**)
Potassium (**U-K**)
Cortisol (**U-Korsol**)
Creatinine (**U-Krea**)
Sodium (**U-Na**)
Uric acid (**U-Uraat**)

Biological sampling and processing

Urine samples were collected in urine cups at volumes of 8 ml from pregnant mothers and transferred to urine transport tubes (Becton-Dickinson (BD), Franklin Lakes, NJ, USA). Samples collected prior to 2003 were shipped in tubes without any bacteriostatic additive (BD, Plymouth, UK), while samples collected in 2003 and after were shipped in urine tubes containing chlorhexidine (UAP Vacutainers, BD, Franklin Lakes, NJ, USA).

For more information on biological sampling, processing and storage, please refer to the original reference articles for NIPH's biobank by Rønningen *et al*. 2006 and Paltiel *et al*. 2014.

Analytical methodology

All of the biomarker measures included in this study were measured from plasma using an **Architect 8200ci integrated analyzer** (Abbott Laboratories, Abbott Park, IL, USA). Urinary albumin was measured using the Multigent microalbumin assay, which is an immunoturbidimetric assay that uses polyclonal antibodies against human albumin. Urinary sodium and potassium were measured using ICT (Integrated Chip Technology), with ion-selective electrodes utilizing membranes selective to the ions. Urinary cortisol was measured using the ARCHITECT Cortisol assay, which is a chemiluminescent microparticle immunoassay (CMIA) used for the quantitative determination of cortisol. Urinary creatinine was determined by an enzymatic method using the Multigent Creatinine (Enzymatic) Assay (SENTINEL CH. Sp.A.). Urinary uric acid was measured by uricase methodology using the Uric Acid assay, intended for the quantitative determination of uric acid in human serum, plasma, or urine.

For more detailed information of the methods used in this study, you may refer to the specific methods description documentation developed by the project study group in MoBa-ETox. This will be provided to approved studies in accompaniment of biological datasets.

Measurement units:

Potassium, creatinine, sodium, uric acid: mmol/L
Cortisol: nmol/L
Albumin (U-Alb-Mi): mg/L

Limit of quantification (LOQ):

Albumin (U-Alb-Mi): 3 mg/L
Potassium (U-K): 4 mmol/L
Cortisol (U-Korsol): 10 mmol/L
Creatinine (U-Krea): 0.5 mmol/L
Sodium (U-Na): 20 mmol/L
Uric acid (U-Uraat): 0.3 mmol/L

Published articles using Mab012

This section also includes articles related to study design, sampling, and data collection.

- Kelsey PT, Papadopoulou E, Borge TC, et al. Ultra-processed food consumption and associations with biomarkers of nutrition and inflammation in pregnancy: The Norwegian Environmental Biobank. Front Nutr. 2022 Dec 8;9:1052001.
- Caspersen IH, Thomsen C, Haug LS, et al. Patterns and dietary determinants of essential and toxic elements in blood measured in mid-pregnancy: The Norwegian Environmental Biobank. Sci Total Environ. 2019 Jun 25;671:299-308.

Restrictions for use

None currently known.

Acknowledgements recommended for use

We recommend that any use of these data in analyses that are presented in peer-review publications acknowledges the original articles describing sampling and data collection:

Kelsey PT, Papadopoulou E, Borge TC, et al. Ultra-processed food consumption and associations with biomarkers of nutrition and inflammation in pregnancy: The Norwegian Environmental Biobank. Front Nutr. 2022 Dec 8;9:1052001.

Disclaimer

The data in Mab012 that are available for use are provided by MoBa on an *as is* basis as they were received from the generating laboratory and have not been curated or quality controlled prior to release. FHI does not provide any guarantees related to data quality and assurance of the original dataset. We reserve the right to periodically remove samples from the dataset belonging to participants who have retracted their consent to participate in this cohort study, and may alter the contents of the associated documentation accordingly.