

SUPPLEMENTARY METHODS

Determination of menstrual phase

For women whose menstrual cycles were irregular or who had amenorrhea, their menstrual phase was annotated as missing data (n=190). Menstrual staging for women with a regular menstrual cycle was determined by calculating the length of days between their last menstrual period (LMP), defined as the onset of their menses, and the time when their full blood count (FBC) was measured, based on their self-reported menstrual cycle length. Specifically, the menstrual phase was defined as the number of days between FBC measurement and LMP equal to or less than 4; the secretory phase was defined as the FBC measurement that took place within 14 days before their next menstruation; the proliferative phase was defined as the interval time between their menstrual phase and secretory phase. When women reported a menstrual cycle length range (e.g. 32 to 36 days) instead of an accurate number, the menstrual staging was determined respectively based on the minimum (32 days), maximum (36 days), and average menstrual cycle length (34 days). Only menstrual staging that has shown identical results across the estimations using three menstrual cycle lengths was reported; those who had mismatched menstrual staging across the estimations were again annotated as missing data (n = 10).

Categorization of variables

Baseline characteristics of study participants were summarised using descriptive statistics. Mean and standard deviation of age, WHR and BMI of participants were calculated. Age, WHR and BMI were also categorised into quartiles, with a balanced number of participants in each of the sub-groups from both the ENDOX and UKBB studies as follows:

- Age ENDOX “≤30”, “30-35”, “35-40”, “40-50” years
- Age UKBB “≤42.5”, “42.5-45”, “45-47.5”, “47.5-50” years
- WHR “≤0.75”, “0.75-0.80”, “0.80-0.85”, “>0.85”
- BMI “≤22.5”, “22.5-25”, “25-30”, “>30”

The levels of basophils, eosinophils and monocytes were not normally distributed. Thus, study participants in both cohorts were categorized into tertiles groups according to the leukocyte subtype counts as follows:

- Basophils “≤0.01”, “0.01-0.04”, “>0.04”
- Eosinophils “≤0.09”, “0.09-0.18”, “>0.18”
- Monocytes “≤0.36”, “0.36-0.50” and “>0.50”