**Supplemental Figure 1.** Untargeted metabolomics workflow



**Supplemental Table 1.** Descriptive characteristics of the eligible women (n=345) enrolled in the EARTH Study who were included in the metabolomics sub-study (n=200) from 2005 to 2015 in the Northeast United States.

|  |  |  |
| --- | --- | --- |
|  | **All eligible** **women** **(n=345)** | **Included in metabolomics study (n=200)** |
| **Demographics1** |  |  |
| Age, years | 35.0 ± 3.9 | 34.8 ±3.9 |
| BMI, kg/m2 | 24.3 ± 4.4 | 23.9 ± 4.6 |
| Race, n (%) |  |  |
| White | 294 (85%) | 171 (86%) |
| African-American | 8 (2%) | 3 (2%) |
| Asian | 31 (9%) | 19 (10%) |
| Other | 12 (3%) | 7 (4%) |
| Smoking Status, n (%) |  |  |
| Never | 248 (72%) | 147 (74%) |
| Ever | 97 (28%) | 53 (27%) |
| Education Level, n (%) |  |  |
| <College | 30 (9%) | 17 (8%) |
| College Graduate | 112 (32%) | 62 (31%) |
| Graduate Degree | 203 (59%) | 121 (61%) |
| Census-Tract Median Income, $ | 105,401 ± 43,244 | 104,382 ± 43,205 |
| **ART Cycle Characteristics1** |  |  |
| Year of Cycle Start, n (%) |  |  |
| 2005-2008 | 100 (29%) | 41 (21%) |
| 2009-2012 | 176 (51%) | 109 (55%) |
| 2013-2015 | 69 (20%) | 50 (25%) |
| Season of Cycle Start, n (%) |  |  |
| Jan-Mar | 87 (25%) | 51 (26%) |
| Apr-Jun | 109 (32%) | 62 (31%) |
| Jul-Sep | 82 (24%) | 53 (27%) |
| Oct-Dec | 67 (19%) | 34 (17%) |
| Initial Infertility Diagnosis, n (%) |  |  |
| Male | 113 (33%) | 55 (28%) |
| Female | 107 (31%) | 66 (33%) |
| Unexplained | 125 (36%) | 79 (40%) |
| Treatment protocol, n (%) |  |  |
| Luteal phase agonist | 262 (76%) | 150 (75%) |
| Flare or antagonist | 83 (24%) | 50 (25%) |
| Day of Serum Sample, n (%) |  |  |
| Day 3 | - | 139 (70%) |
| Monitoring Phase | - | 50 (25%) |
| Oocyte Retrieval | - | 11 (6%) |

1 Data presented as average ± standard deviation unless otherwise stated.

**Supplemental Table 2.** Correlation matrix of PM2.5 Exposure windows among 200 women in the EARTH study from 2005 to 2015 in the Northeast United States

|  |  |  |
| --- | --- | --- |
| **Exposure** | **Average ± SD1** | **Correlation Coefficients** |
| **1 Day** | **2 Days** | **3 Days** | **2 Weeks** | **3 Months** |
| **1-Day Average** | 8.7 ± 4.0 | 1.00 |  |  |  |  |
| **2-Day Average** | 8.8 ± 3.6 | 0.89 | 1.00 |  |  |  |
| **3-Day Average** | 9.0 ± 3.4 | 0.77 | 0.94 | 1.00 |  |  |
| **2-Week Average** | 8.8 ± 2.3 | 0.58 | 0.66 | 0.73 | 1.00 |  |
| **3-Month Average** | 9.0 ± 1.9 | 0.26 | 0.31 | 0.35 | 0.56 | 1.00 |

1 Data presented as average ± standard deviation.

**Supplemental Table 3.** Metabolites identified using level 1 evidence among 200 women in the EARTH study from 2005 to 2015 in the Northeast United States

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Superclass** | **Class** | **Metabolite** | **ESI** | **M/Z1** | **Time1** |
| Benzenoids (n=1) | Benzene and substituted derivatives (n=1) | Bis(2-Ethylhexyl)phthalate | + | 391.2848 | 25.5 |
|  |  |  |  |  |  |
| Lipids and lipid-like molecules (n=1) | Prenol lipids (n=1) | Retinoic acid | + | 301.2167 | 26.5 |
|  |  |  |  |  |  |
| Organic acids and derivatives (n=4) | Carboxylic acids and derivatives (n=4) | Glutamic acid | - | 147.0532 | 19.8 |
| N-Acetyl-serine | - | 147.0532 | 21.0 |
| N-Methyl-aspartic acid | - | 147.0532 | 19.6 |
| O-Acetyl-serine | - | 147.0532 | 20.8 |
|  |  |  |  |  |  |
| Organoheterocyclic compounds (n=1) | Imidazopyrimidines (n=1) | Hypoxanthine | - | 135.03071 | 22.8 |
|  |  |  |  |  |  |

1 M/Z and retention times are the values found using our lab’s standard workflow using authentic standards and do not necessarily match the monoisotopic masses listed on PubChem.