**Supplemental Tables**

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| **Table S1: Correlations between parameters that influence the quality of the rFNA sample (119 women)\*.**  |
| **Spearman** **Correlation coefficients and P- values** | **Age** | **BMI** | **Breast density** | **Total cell number** | **Total****lipid** | **Masood score** | **CMI** |
| **Age** | **…** |  |  |  |  |  |  |
| **BMI** | r = -0.001P = 0.988(P = 1.000) | **…** |  |  |  |  |  |
| **Breast density** | r = -0.114P = 0.216(P = 1.000) | r = -0.540P < 0.0001(P < 0.0007) | … |  |  |  |  |
| **Total cell number** | r = -0.170P = 0.064(P = 0.448) | r = -0.318P = 0.0004(P = 0.003) | r = 0.324P = 0.0003(P = 0.002) | **…** |  |  |  |
| **Total lipid** | r = 0.216P = 0.019(P = 0.133) | r = 0.101P = 0.277(P = 1.000) | r = -0.040P = 0.666(P = 1.000) | r = -0.194P = 0.035(P = 0.245) | **…** |  |  |
| **Masood score** | r = -0.200P = 0.038(P = 0.266) | r = -0.151P = 0.150(P = 1.000) | r = 0.155P = 0.110(P = 0.770) | r = 0.656P < 0.0001(P < 0.0007) | r = -0.085P = 0.380(P = 1.000) | **…** |  |
| **CMI** | r = -0.009P = 0.921(P = 1.000) | r = -0.176P = 0.056(P = 0.392) | r = 0.242P = 0.008(P = 0.056) | r = 0.505P < 0.0001(P < 0.0007) | r = -0.010P = 0.280(P = 1.000) | r = 0.374P < 0.0001(P < 0.0007) | **…** |
| \* P values with parentheses were adjusted for multiple comparisons with Bonferroni correction of the 7 parameters. Correlations that remain significant after Bonferroni correction are in shaded boxes. |

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| **Table S2. Correlation between Breast and serum hormone concentrations.** |
| 1. **Estradiol**
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|  | N | Spearman r | (95% CI) | p |
| Total | 117 | 0.34 | (0.16 to 0.49) | 0.0002\* |
| Premenopausal | 53 | 0.37 | (0.11 to 0.59) | 0.006 |
| Postmenopausal  | 64 | 0.32 | (0.07 to 0.53) | 0.01 |
| Follicular | 14 | 0.33 | (-0.26 to 0.74) | 0.25 |
| Midcycle | 18 | 0.76 | (0.43 to 0.91) | 0.0003\* |
| Luteal | 21 | -0.07 | (-0.5 to 0.38) | 0.75 |

1. **Progesterone**
 |
|  | N | Spearman r | (95% CI) | p |
| Total | 82 | 0.69 | (0.55 to 0.79) | < 0.0001\* |
| Premenopausal | 49 | 0.82 | (0.69 to 0.89) | < 0.0001\* |
| Postmenopausal  | 33 | 0.01 | (-0.34 to 0.36) | 0.96 |
| Follicular | 13 | 0.38 | (-0.23 to 0.78) | 0.2 |
| Midcycle | 17 | 0.66 | (0.25 to 0.87) | 0.005\* |
| Luteal | 19 | 0.71 | (0.36 to 0.88) | 0.001\* |
| \* P values remain significant after adjustment for multiple comparisons with Bonferroni correction. |

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| **Table S3. Cytology according to menopausal status and menstrual cycle** a |
| **By Menopausal Status (median with IQR)** |
| **Cytology** | **Premenopausal (n=54)** | **Postmenopausal (n=65)** | **P\*** |
| Total cell numbers | 11000 (2000, 38500) | 4000 (1000, 13000) | 0.020 |
| Masood Score | 15 (13, 16) | 13 (12, 15) | 0.070 |
| ─Cellular Arrangement b | 3 (2, 3) | 0 (0, 1) | 0.159 |
| −Cellular Pleomorphism c | 2 (2, 2) | 2 (2, 2) | 0.928 |
| ─Myoepithelial Cells d | 3 (3, 3) | 3 (2, 3) | 0.053 |
| ─Anisonucleosis e | 2 (2, 3) | 2 (2, 2) | 0.587 |
| ─Chromatin Clumping f | 3 (2, 3) | 2 (2, 3) | 0.154 |
| ─Nucleoli g | All subjects had the same score (2=micronucleoli) |
| **By Menstrual phase (median with IQR)** |
| **Cytology** | **Follicular (n=14)**  | **Midcycle (19)** | **Luteal (n=21)** | **P#** |
| Total cell numbers | 3500 (400, 21500) | 14000 (2000, 38000) | 16000 (2000, 46000) | 0.197 |
| Masood Score a | 14.5 (13.3, 15) | 14 (13, 16) | 15 (13, 16) | 0.573 |
| ─Cellular Arrangement b | 3 (2.25, 3) | 2 (2, 3) | 3 (2, 3) | 0.240 |
| −Cellular Pleomorphism c | 2 (2, 2) | 2 (2, 2.25) | 2 (2, 2) | 0.105 |
| ─Myoepithelial Cells d | 3 (3, 3) | 3 (3, 3) | 3 (3, 3) | 0.596 |
| ─Anisonucleosis e | 2 (2, 2) | 2 (2, 3) | 2 (2, 3) | 0.531 |
| ─Chromatin Clumping f | 2.5 (2, 3) | 2 (2, 3) | 3 (2, 3) | 0.581 |
| a The available data of cytology evaluation was n= 46 to 52 and n=61 to 64 for premenopausal and postmenopausal women, respectively. b Cellular arrangement was scored as 1=monolayer; 2=nuclear overlapping; 3=clustering; and 4=loss of cohesion.c Cellular pleomorphism was scored as 1= absent; 2=mild; 3=moderate; 4=conspicuous.d Myoepithelial cells were scored as 1=many; 2=moderate; 3=few; and 4=absent.e Anisonucleosis was scored as 1=absent; 2=mild; 3=moderate; and 4=conspicuous.f Chromatin clumping was scored as 1= absent; 2=rare; 3=occasional; and 4=frequent.g Nucleoli were scored as 1= absent; 2=micronucleoli; 3=micro and/or rare macro-nucleoli; and 4=predominately macronucleoli.\* Between-group comparison using Whitney U test. There were no significant differences after adjustment for multiple comparisons with Bonferroni correction.# Comparison among three menstrual phases using Kruskal-Wallis Rank Sum test. There were no significant differences after adjustment for multiple comparisons with Bonferroni correction. |