CLAIMS

WHAT WE CLAIM IS:

1. A method for assessing a likelihood of infertility in an individual comprising:
   (a) determining by an assay a level of a first bacteria, a level of a second bacteria, and/or a level of a miRNA in a sample from the individual;
   (b) comparing a ratio of the first bacteria to the second bacteria and/or the level of the miRNA in the sample to a cohort of control samples; and
   (c) determining the individual as having the likelihood of infertility if the ratio of the first bacteria to the second bacteria and/or the level of the miRNA in the sample is different from the cohort of control sample.

2. The method of claim 1, wherein the first bacteria and/or the second bacteria is selected from the group consisting of a Proteobacteria, an Actinobacteria, a Bacteroidetes, a Firmicutes, and any combination thereof.

3. The method of claim 1, wherein the first bacteria and/or the second bacteria is a species of a Proteobacteria, an Actinobacteria, a Bacteroidetes, or a Firmicutes.

4. The method of claim 1, wherein the first bacteria is Lactobacillus iners and the second bacteria is Lactobacillus brevis.

5. The method of claim 1, wherein the first bacteria is a Firmicutes and the second bacteria is a Bacteroidetes.

6. The method of claim 1, wherein the miRNA is derived from a transcriptome of the individual, or wherein the miRNA is selected from the group consisting of miR21-5p, miR155-5p, and any combination thereof.

7. The method of claim 1, wherein the level of the miRNA is elevated above a threshold level of the miRNA derived from the cohort of control samples.

8. The method of claim 1, wherein the ratio of the first bacteria to the second bacteria is elevated above a threshold level of a ratio of the first bacteria to the second bacteria derived from the cohort of control samples.

9. The method of claim 1, wherein the ratio of the first bacteria to the second bacteria is decreased below a threshold level of a ratio of the first bacteria to the second bacteria derived from the cohort of control samples.

10. The method of claim 1, wherein the control samples are obtained from individuals that are fertile.

11. The method of claim 1, further comprising determining by an assay a level of an inflammatory biomarker, and wherein the likelihood of infertility in the individual is determined in part based on the level of the inflammatory biomarker.

12. The method of claim 11, wherein the inflammatory biomarker is associated with a disease or disorder selected from the group consisting of anemia, hypovitaminosis B, hypovitaminosis D, hypothyroidism, a metabolic syndrome, polycystic ovary syndrome, endometriosis, autoimmunity, and any combination thereof.

13. The method of claim 11, wherein the inflammatory biomarker is selected from the group consisting of anti-thyroid peroxidase, thyroid antithyroglobulin antibody, anti-nuclear antibody, anti-Saccharomyces cerevisiae antibody IgA, anti-Saccharomyces cerevisiae antibody IgG, and any combination thereof.

14. The method of claim 1, wherein the likelihood of infertility in the individual is determined in part based on the individual's medical history.

15. The method of claim 14, wherein the individual's medical history comprises determining a glycidic metabolic component, a lipidic metabolic component, intestinal permeability, or body mass index of the individual.

16. The method of claim 1, wherein the sample is selected from the group consisting of a saliva sample, a buccal sample, a blood sample, a urine sample, an anal sample, a vaginal sample, and any combination thereof.

17. The method of claim 1, wherein the assay is selected from the group consisting of quantitative real-time PCR, northern blot, RNA-seq, microarray, ELISA, homogenous protein assays, immunoblot, and mass spectrometry.

18. The method of claim 1, wherein the miRNA provides an area under the curve (AUC) value of greater than about 0.8 in a receiver operating characteristic (ROC) curve analysis.

19. The method of claim 18, wherein the miRNA provides at least about an 80% sensitivity as determined by ROC curve analysis in assessing the likelihood of infertility in the individual.

20. The method of claim 18, wherein the miRNA provides an accuracy of at least about 80% as determined by ROC curve analysis in assessing the likelihood of infertility in the individual.