

1/15

## Oral microbiome-based feline dental health test - workflow

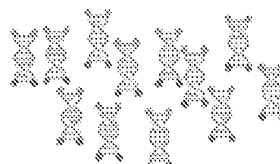
Oral swab collected  
from the cat



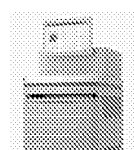
DNA extraction



Metagenomic NGS  
library preparation



Shotgun metagenomic  
NGS



Data analysis and results  
report generation  
(4-6 weeks from sample to report)

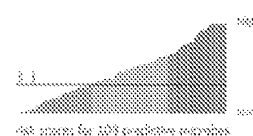
### Risk for periodontal disease

Periodontal disease affects the tissues surrounding the teeth. Initial stages are classified as gingivitis, while advanced cases are known as periodontitis.

low risk: 0 - 5.3 medium risk: 5.4 - 6.6 high risk: 6.7 - 10

#### OVERALL RISK:

- ☐ LOW  
☒ MEDIUM  
☐ HIGH

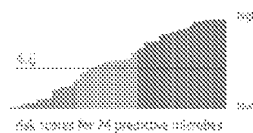


### Risk for tooth resorption

Tooth resorption is a relatively common condition characterized by progressive erosion enamel.

#### OVERALL RISK:

- ☐ LOW  
☒ MEDIUM  
☐ HIGH



### Risk for bad breath (halitosis)

When bad breath is a persistent problem for a cat, this could be indicative of more serious general health issues.

#### OVERALL RISK:

- ☒ LOW  
☐ MEDIUM  
☐ HIGH

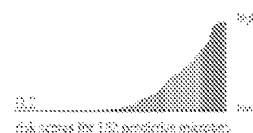


FIG. 1A

SUBSTITUTE SHEET (RULE 26)

2/15

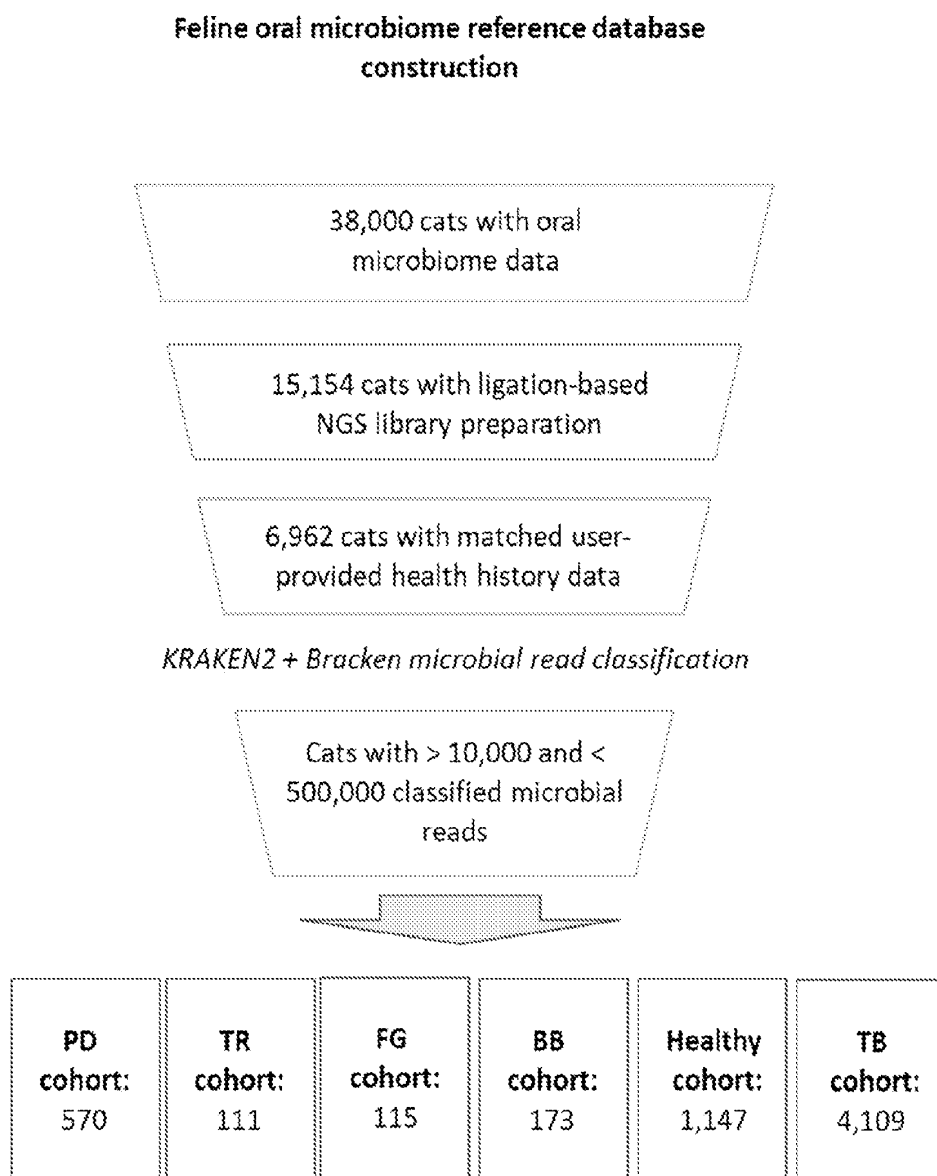


FIG. 1B

3/15

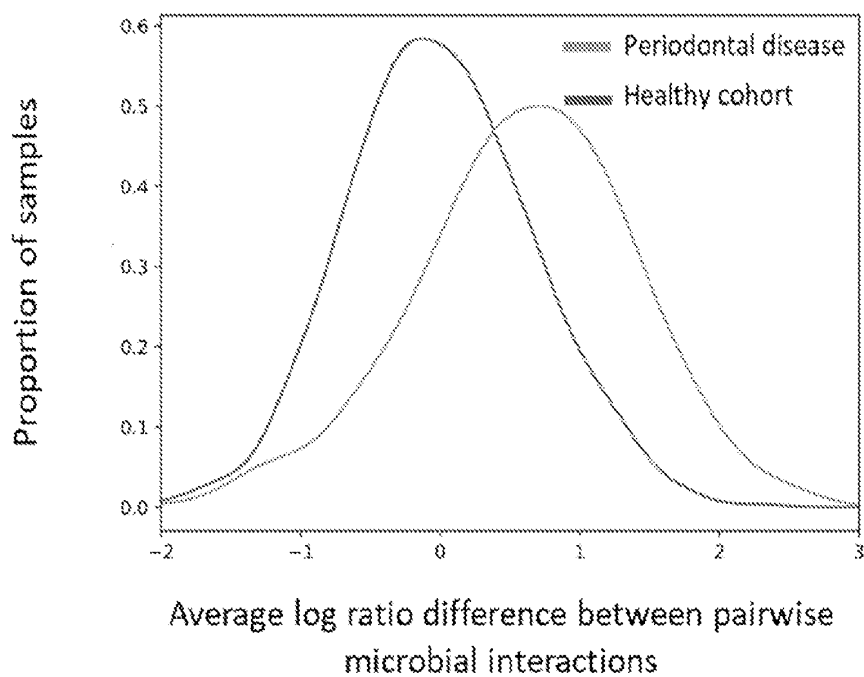


FIG. 2A

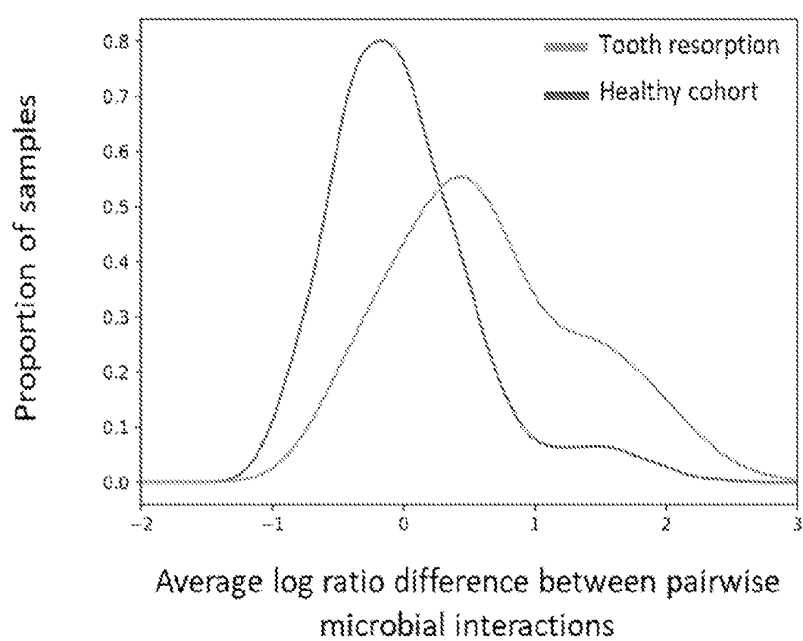


FIG. 2B

4/15

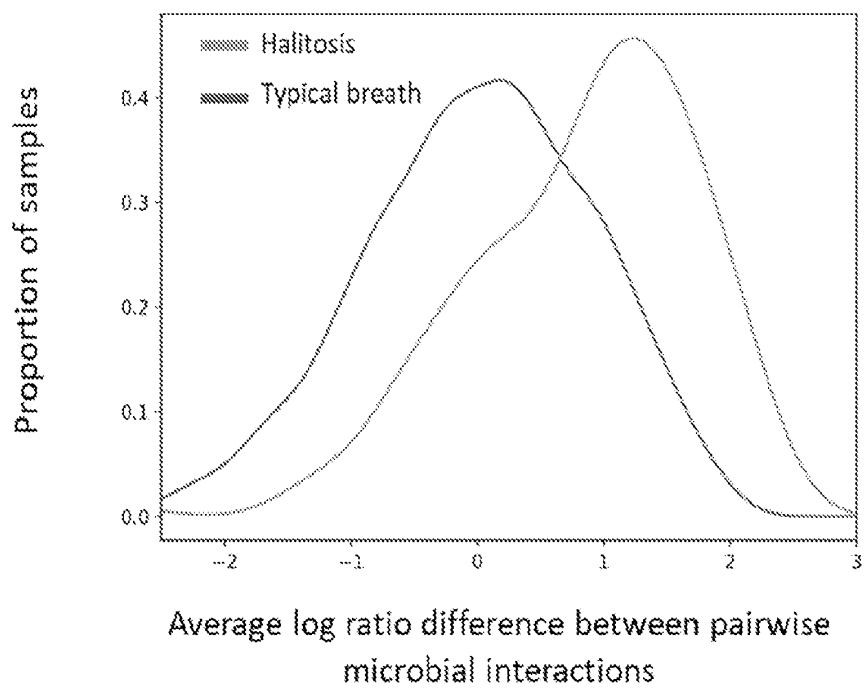


FIG. 2C

5/15

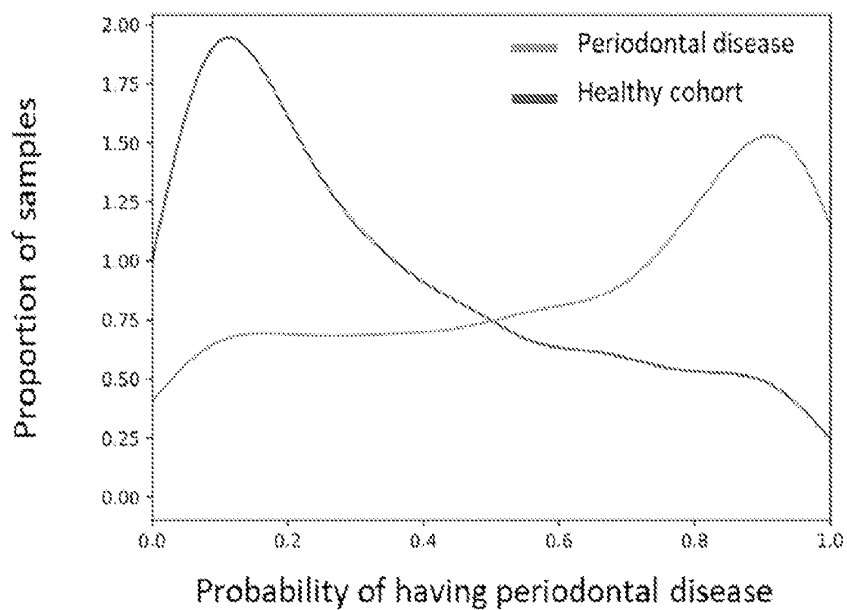


FIG. 3A

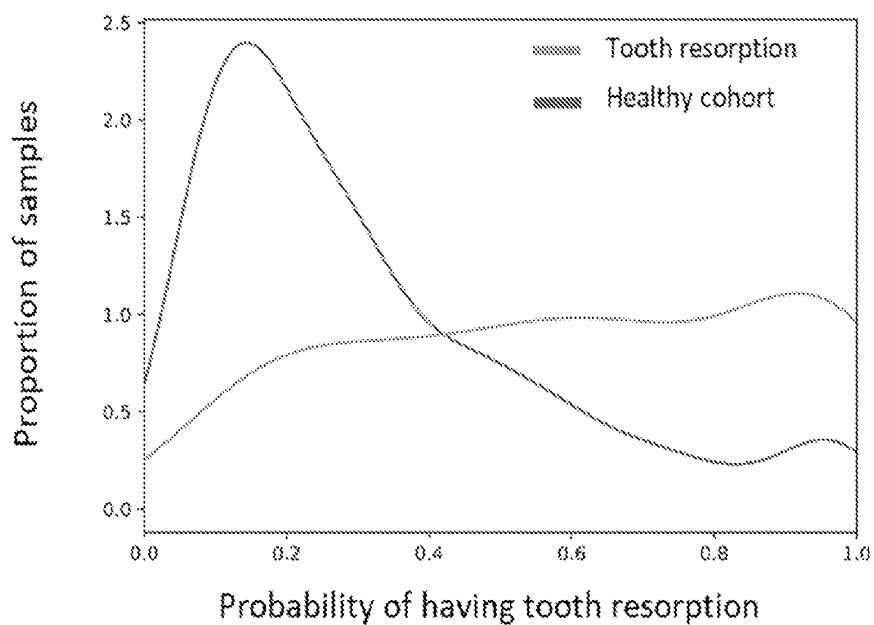


FIG. 3B

6/15

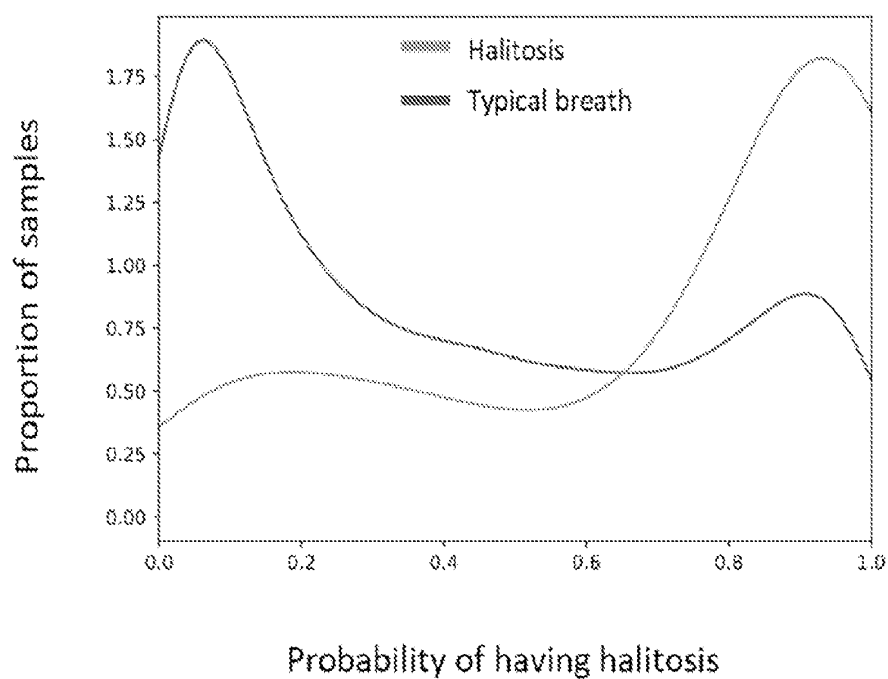


FIG. 3C

| Condition           | Sensitivity | Specificity |
|---------------------|-------------|-------------|
| Periodontal disease | 66%         | 70%         |
| Tooth resorption    | 63%         | 78%         |
| Halitosis           | 72%         | 62%         |

**Sensitivity** = percentage known positive samples classified as medium or high risk

**Specificity** = percentage known negative samples classified as low risk

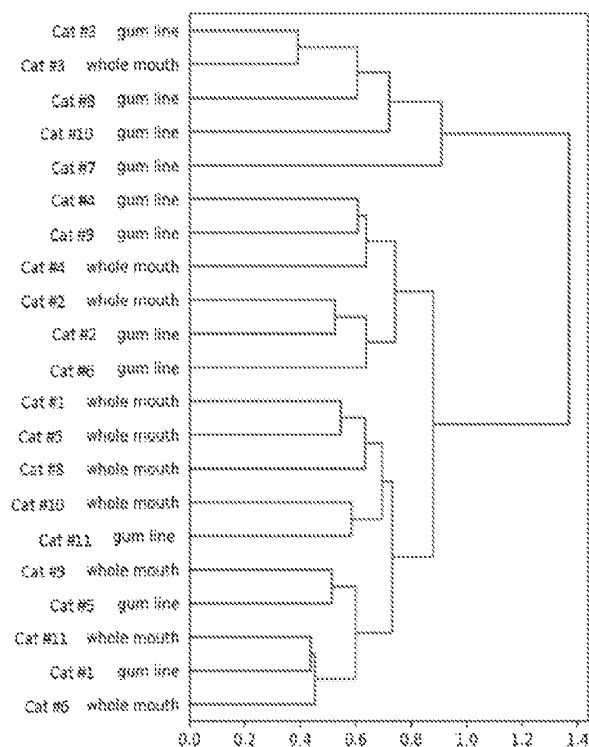
FIG. 3D

7/15

**Overlap of predictive microbes between feline periodontal disease, tooth resorption and halitosis**

**FIG. 4**

8/15



| Cat     | Dental condition    | Swab condition |             |
|---------|---------------------|----------------|-------------|
|         |                     | Gum line       | Whole mouth |
| Cat #1  | Periodontal disease | 0.028          | 0.017       |
| Cat #1  | Tooth resorption    | 0.14           | 0.06        |
| Cat #1  | Halitosis           | 0              | 0.0002      |
| Cat #2  | Periodontal disease | 0.006          | 0.07        |
| Cat #2  | Tooth resorption    | 0.06           | 0.06        |
| Cat #2  | Halitosis           | 0              | 0           |
| Cat #3  | Periodontal disease | 0.92           | 0.98        |
| Cat #3  | Tooth resorption    | 0.88           | 0.89        |
| Cat #3  | Halitosis           | 0.7            | 0.84        |
| Cat #4  | Periodontal disease | 0.54           | 0.57        |
| Cat #4  | Tooth resorption    | 0.83           | 0.332       |
| Cat #4  | Halitosis           | 0              | 0.003       |
| Cat #5  | Periodontal disease | 0.34           | 0.23        |
| Cat #5  | Tooth resorption    | 0.1            | 0.08        |
| Cat #5  | Halitosis           | 0.006          | 0.06        |
| Cat #6  | Periodontal disease | 0.02           | 0.28        |
| Cat #6  | Tooth resorption    | 0.06           | 0.13        |
| Cat #6  | Halitosis           | 0.0003         | 0.0003      |
| Cat #7  | Periodontal disease | 1              | NA          |
| Cat #7  | Tooth resorption    | 1              | NA          |
| Cat #7  | Halitosis           | 0.82           | NA          |
| Cat #8  | Periodontal disease | 0.77           | 0.74        |
| Cat #8  | Tooth resorption    | 0.22           | 0.15        |
| Cat #8  | Halitosis           | 0.58           | 0.06        |
| Cat #9  | Periodontal disease | 0.25           | 0.14        |
| Cat #9  | Tooth resorption    | 0.13           | 0.06        |
| Cat #9  | Halitosis           | 0.0001         | 0.002       |
| Cat #10 | Periodontal disease | 0.05           | 0.02        |
| Cat #10 | Tooth resorption    | 0.066          | 0.06        |
| Cat #10 | Halitosis           | 0.338          | 0.002       |
| Cat #11 | Periodontal disease | 0.08           | 0.23        |
| Cat #11 | Tooth resorption    | 0.06           | 0.097       |
| Cat #11 | Halitosis           | 0.0009         | 0.0009      |

FIG. 5A

9/15

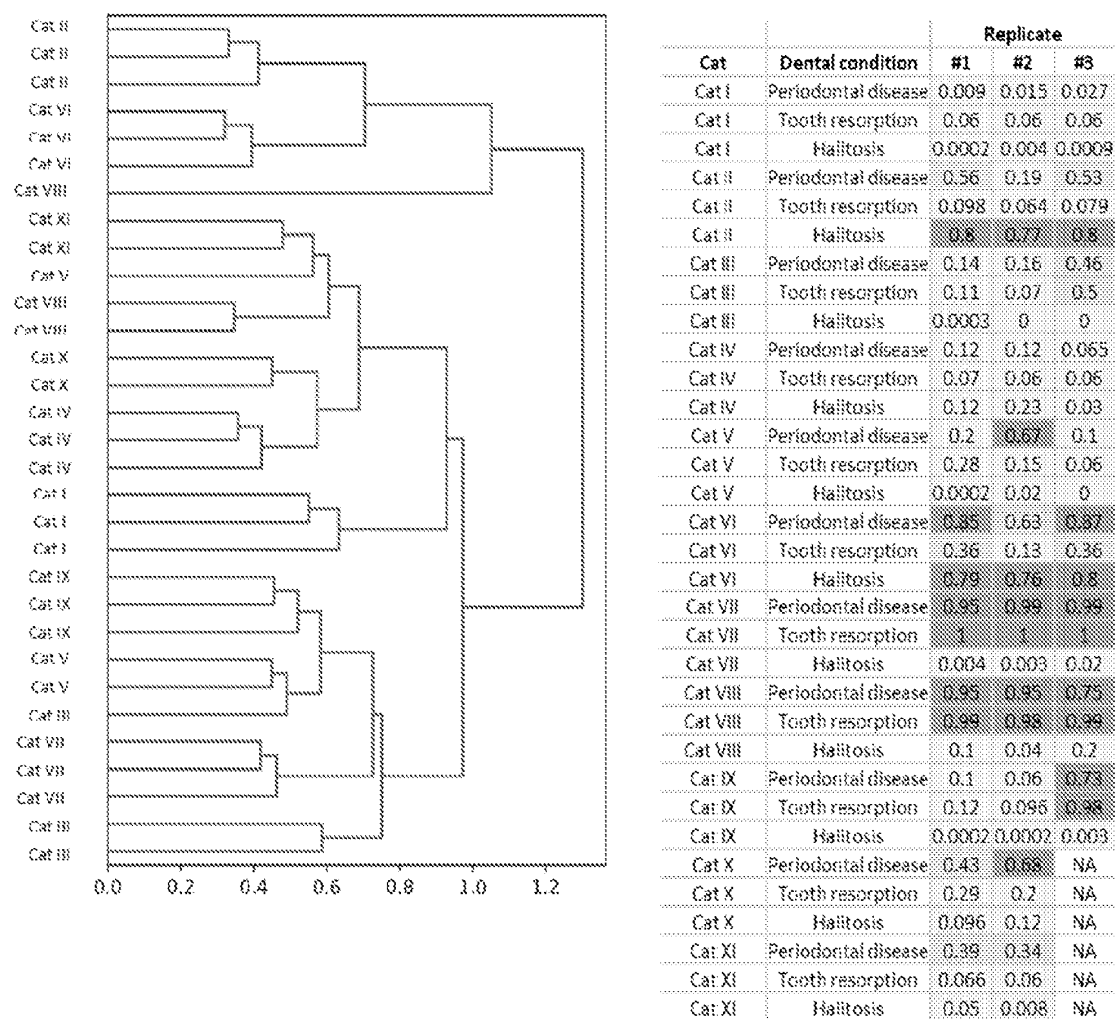


FIG. 5B

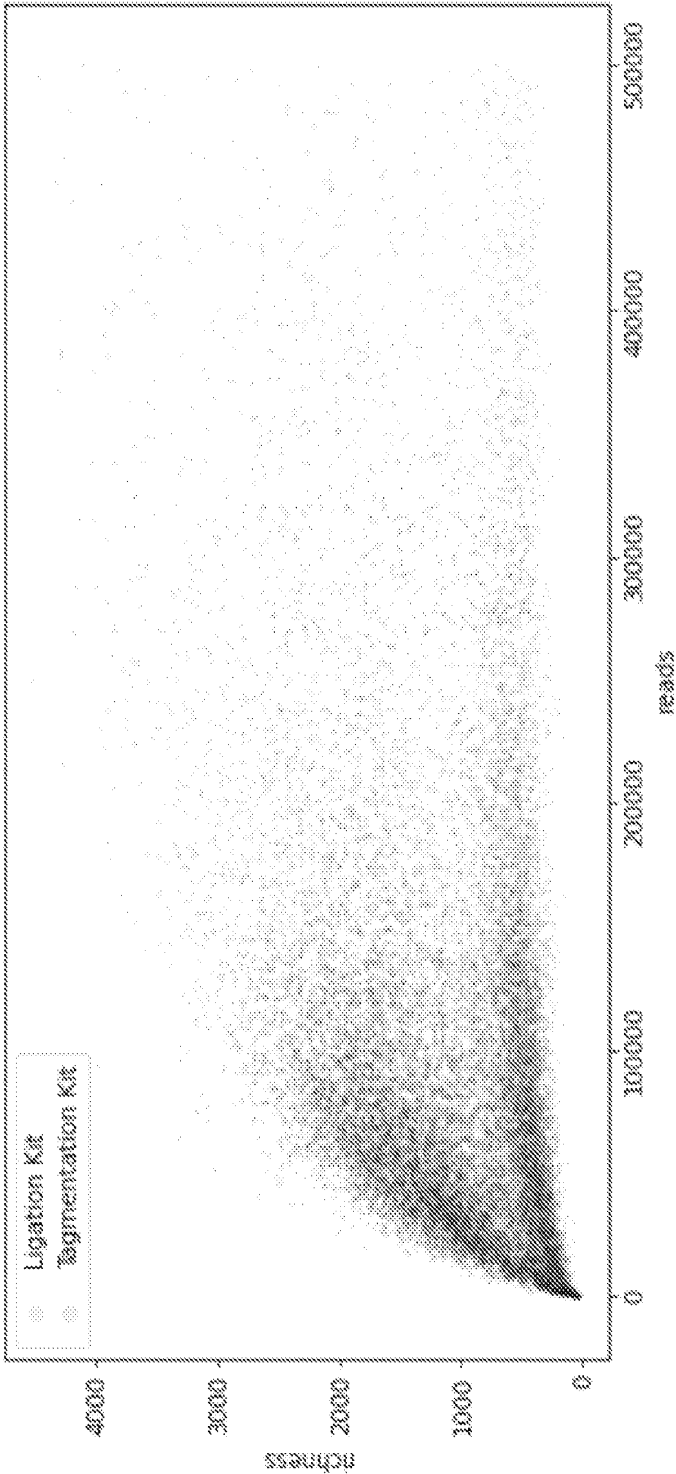


FIG. 6

11/15

## Oral microbiome based periodontal disease risk assessment

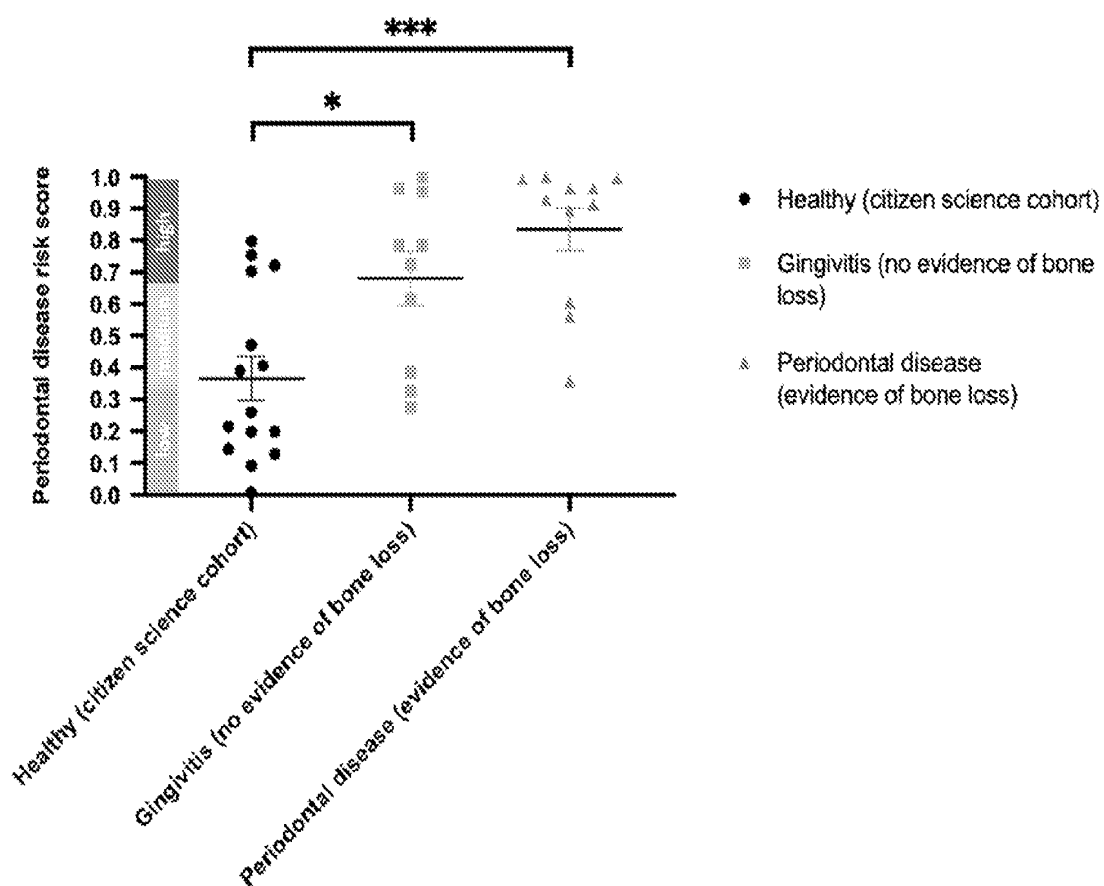


FIG. 7

12/15

## Oral microbiome based bad breath risk assessment

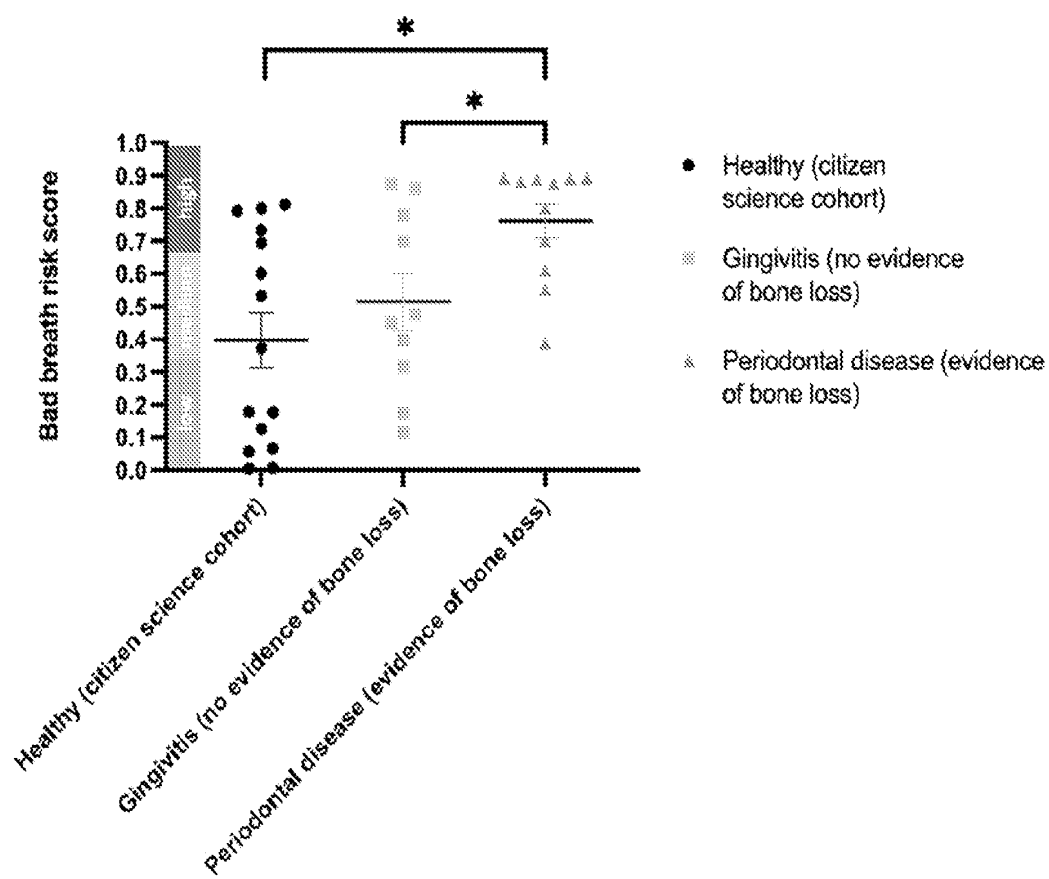


FIG. 8

13/15

## Oral microbiome based tooth resorption risk assessment

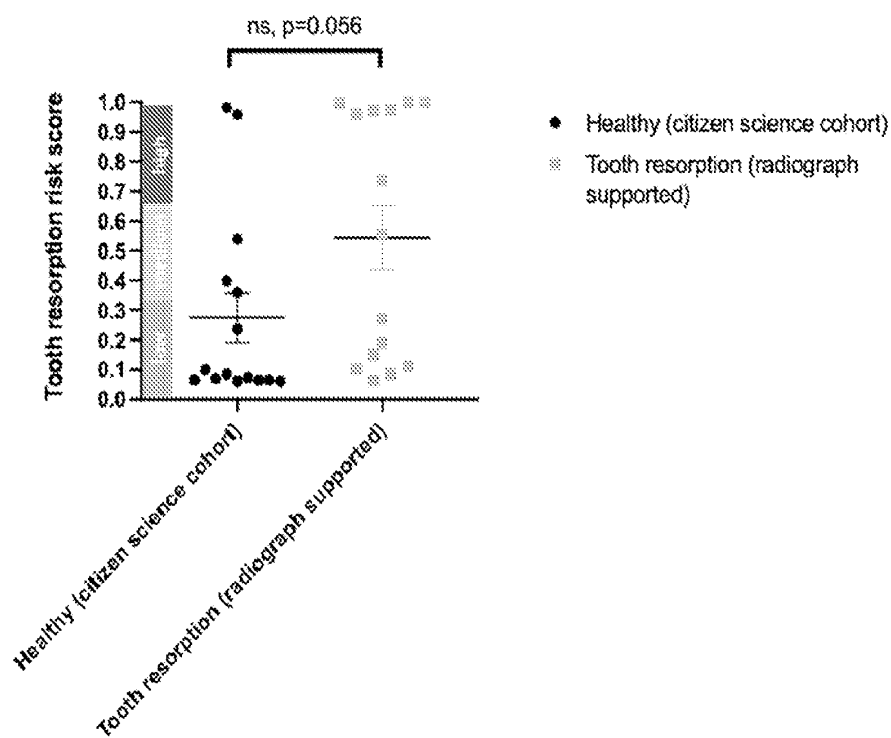


FIG. 9A

Oral microbiome based tooth resorption risk assessment

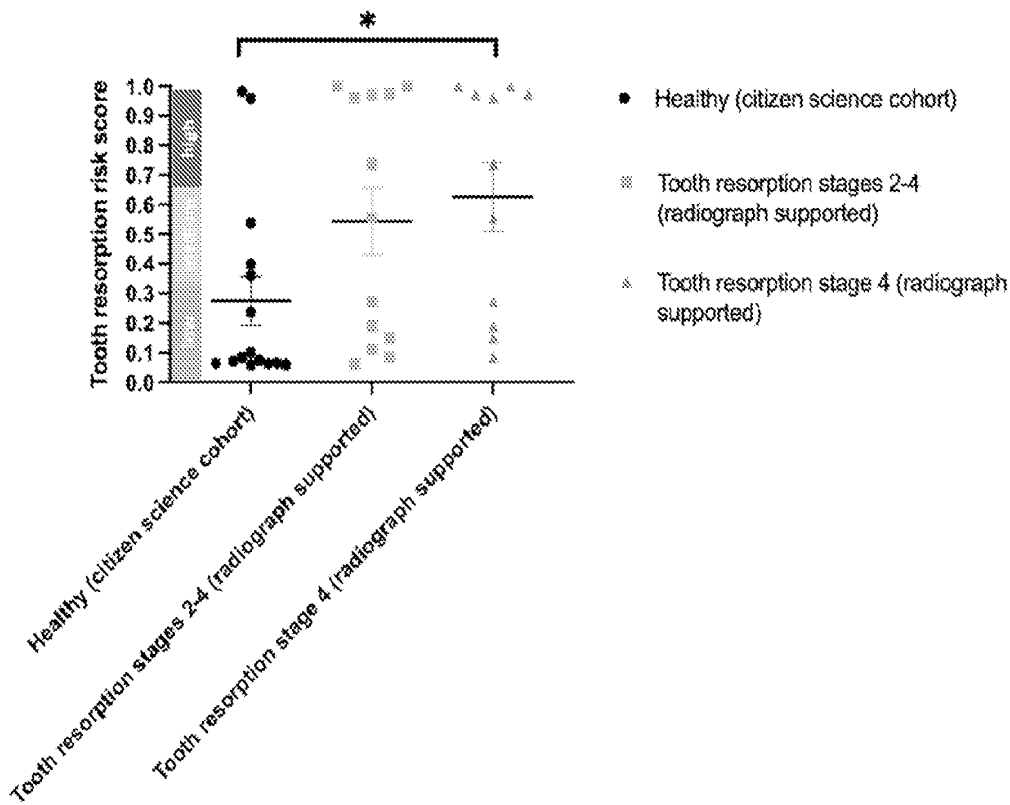
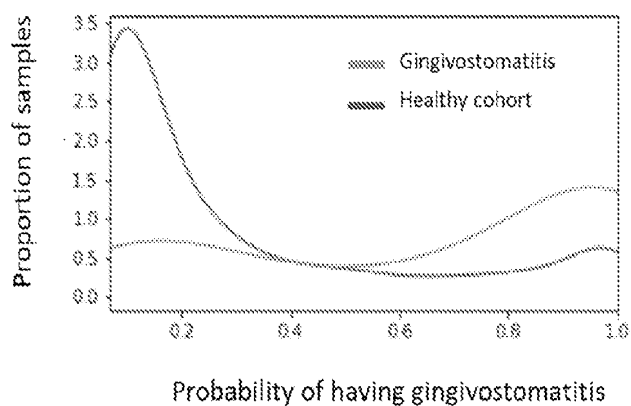
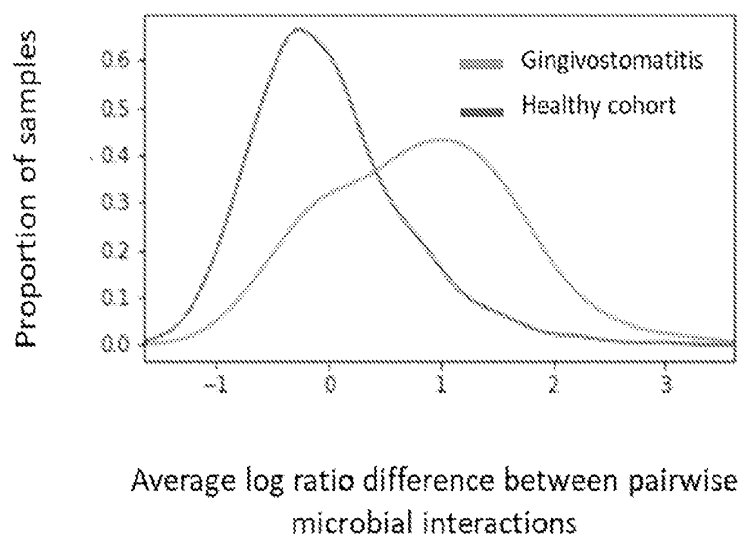


FIG. 9B

15/15



**Sensitivity** = percentage known positive samples classified as medium or high risk = **72%**

**Specificity** = percentage known negative samples classified as low risk = **71%**

FIG. 10B