

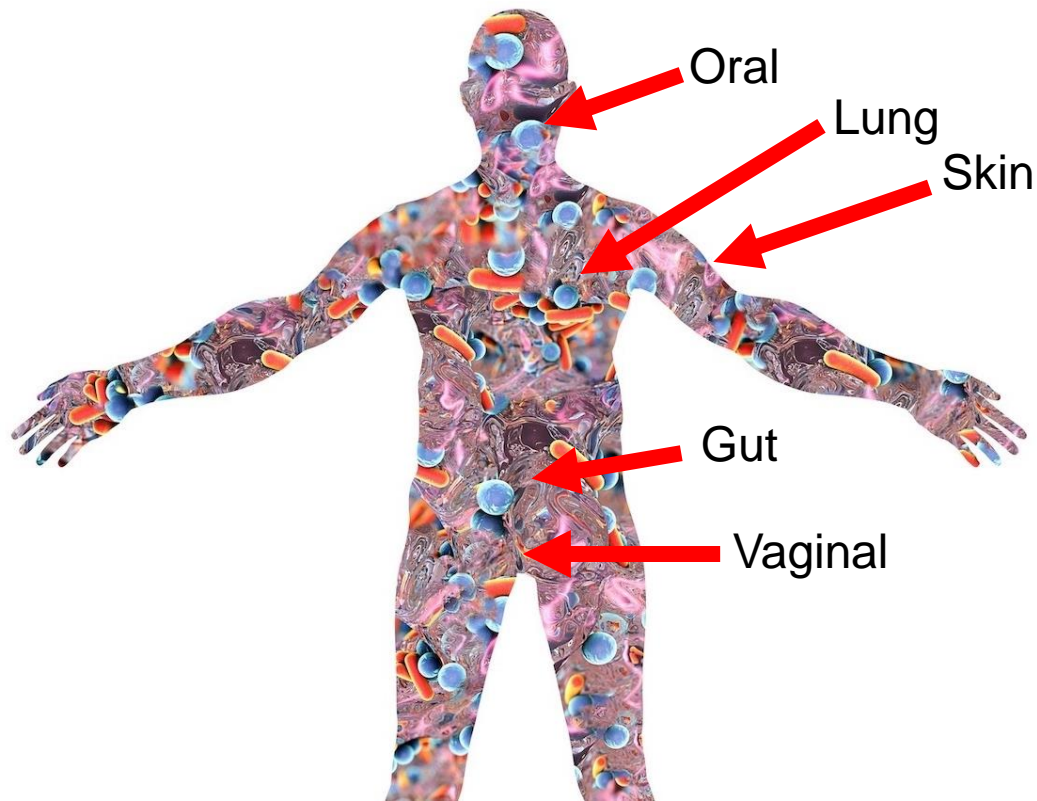
Investigating the oral microbiome for biomarker discovery in cancer using data from the Canadian Partnership for Tomorrow's Health

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The Human Microbiome

You are never alone...



KATERYNA KON/SCIENCE PHOTO LIBRARY, via Getty Images



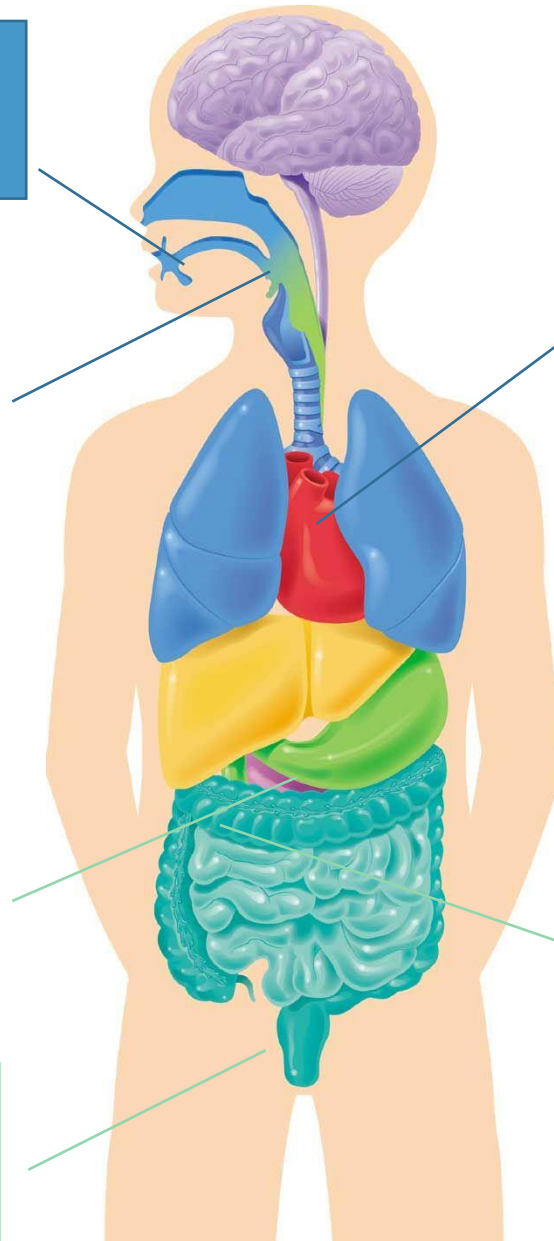
Oral Microbiome & Disease

Gingivitis
(Haung et al., 2011)

Oral Cancers
(Ahn et al., 2012)

Pancreatic Cancer
(Fan et al., 2018)

Colon Cancer
(Flemer et al., 2018)



Atherosclerosis
(Slocum et al., 2016)

Inflammatory Bowel Disease
(Docktor et al., 2012)

Oral Microbiome

Body Composition



Wu et al., 2018

Demographics



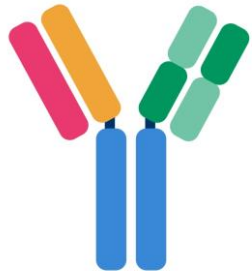
Renson et al., 2019

Diet



Murtaza et al., 2019

Immune System



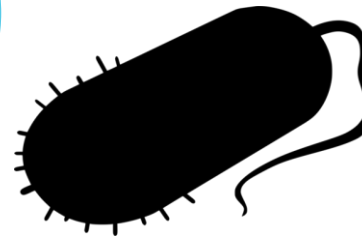
Presti et al., 2018

Life style



Renson et al., 2019

Infections



Scannapieco et al., 2013

Objectives

- 1) What anthropometric, dietary and lifestyle factors are associated with the oral microbiome?
- 2) Determine the presence of oral microbiome biomarkers in breast, prostate, and colon cancer



Analysis of the healthy oral microbiome

Atlantic PATH
cohort
N=: 35577

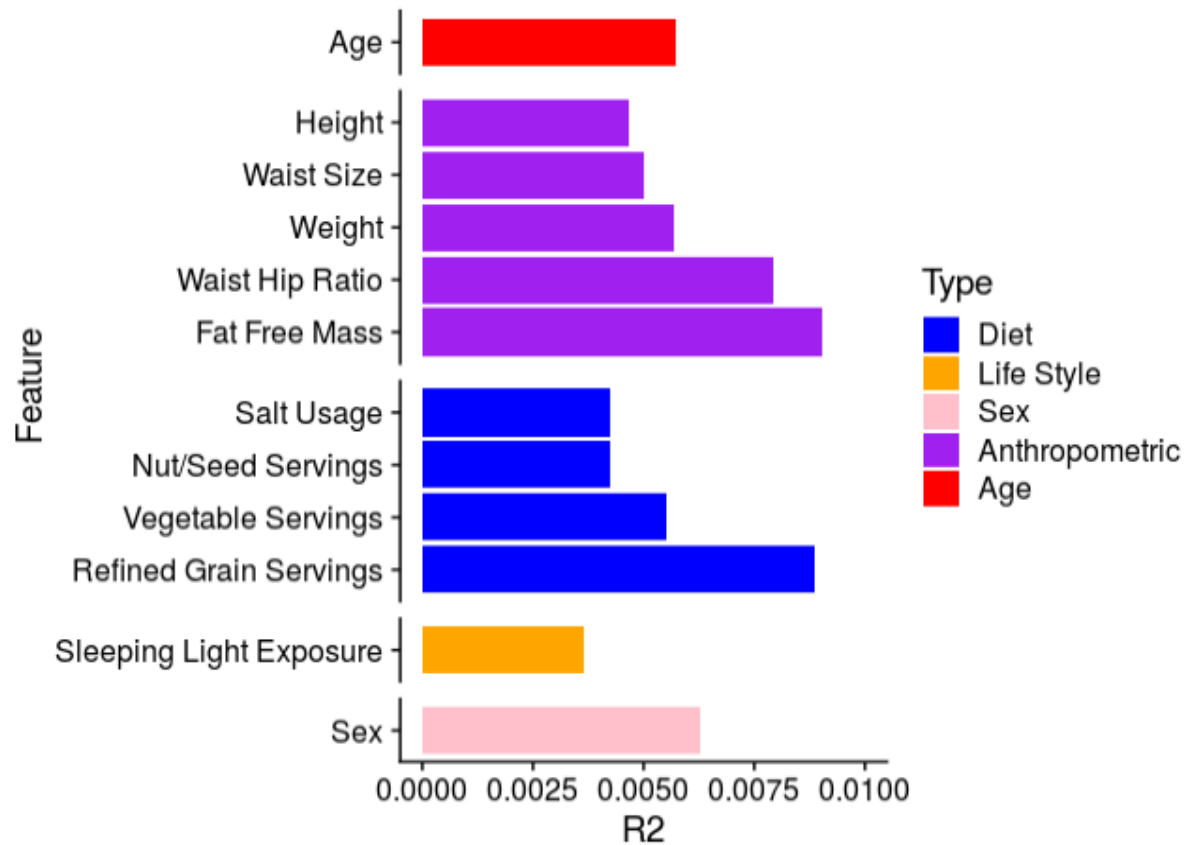
41 Variables

- Geography
- Demographics
- Body Composition
- Diet

Atlantic
PATH

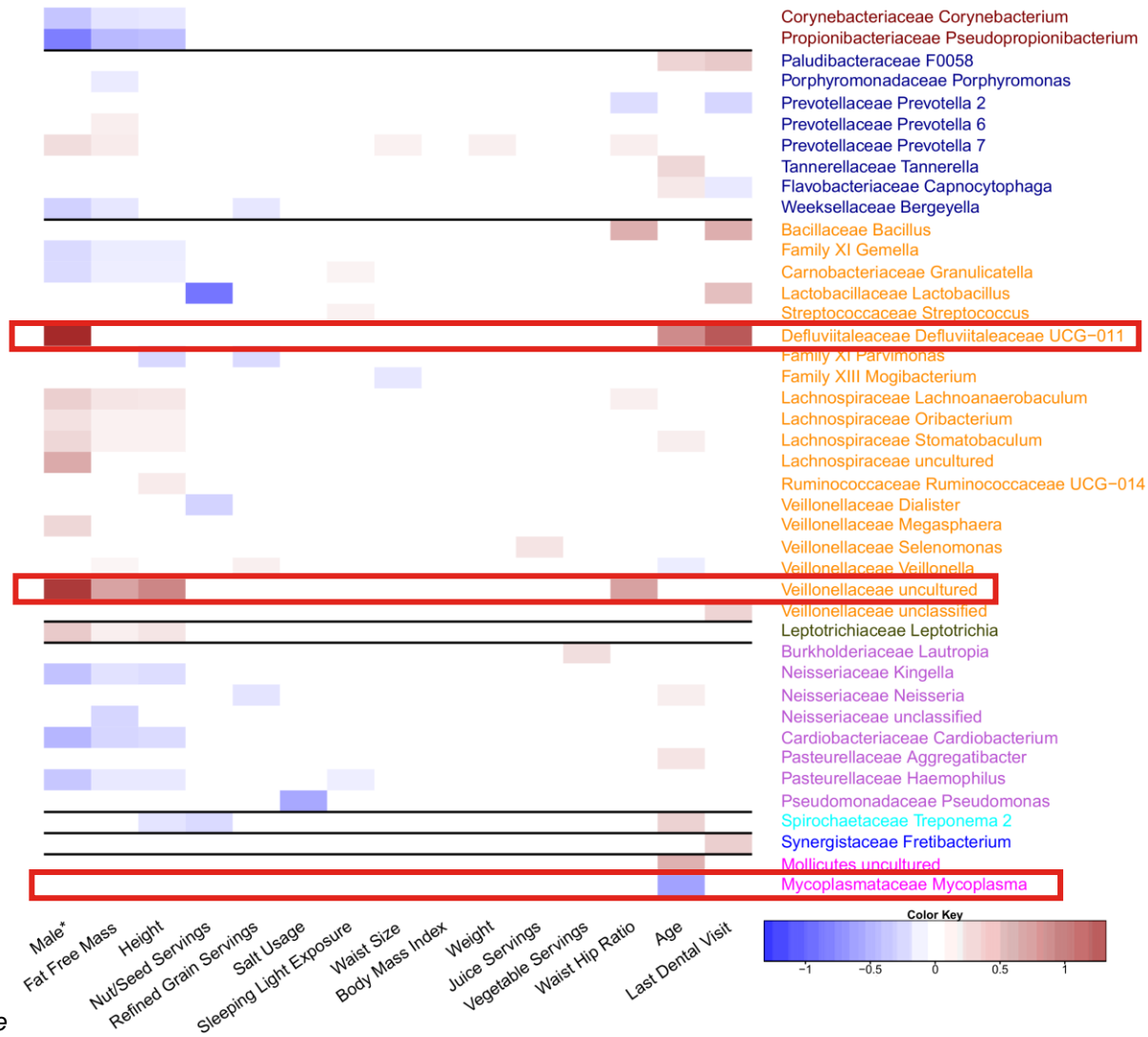
Nearing et al., 2020, *msphere*

Factors related to oral microbiome composition



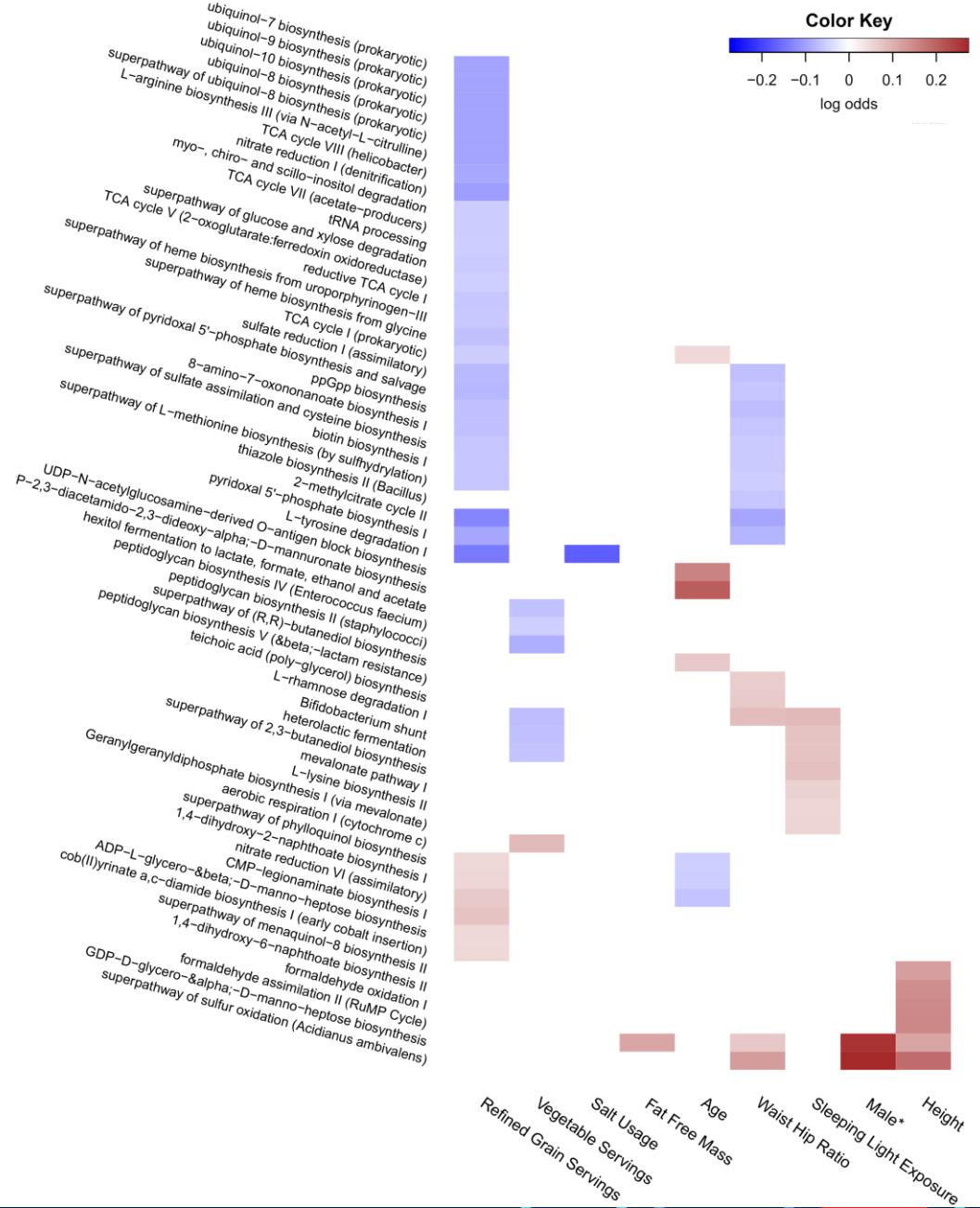
Nearing et al., 2020, *msphere*

Multiple oral microbiome genera are associated to daily life factors



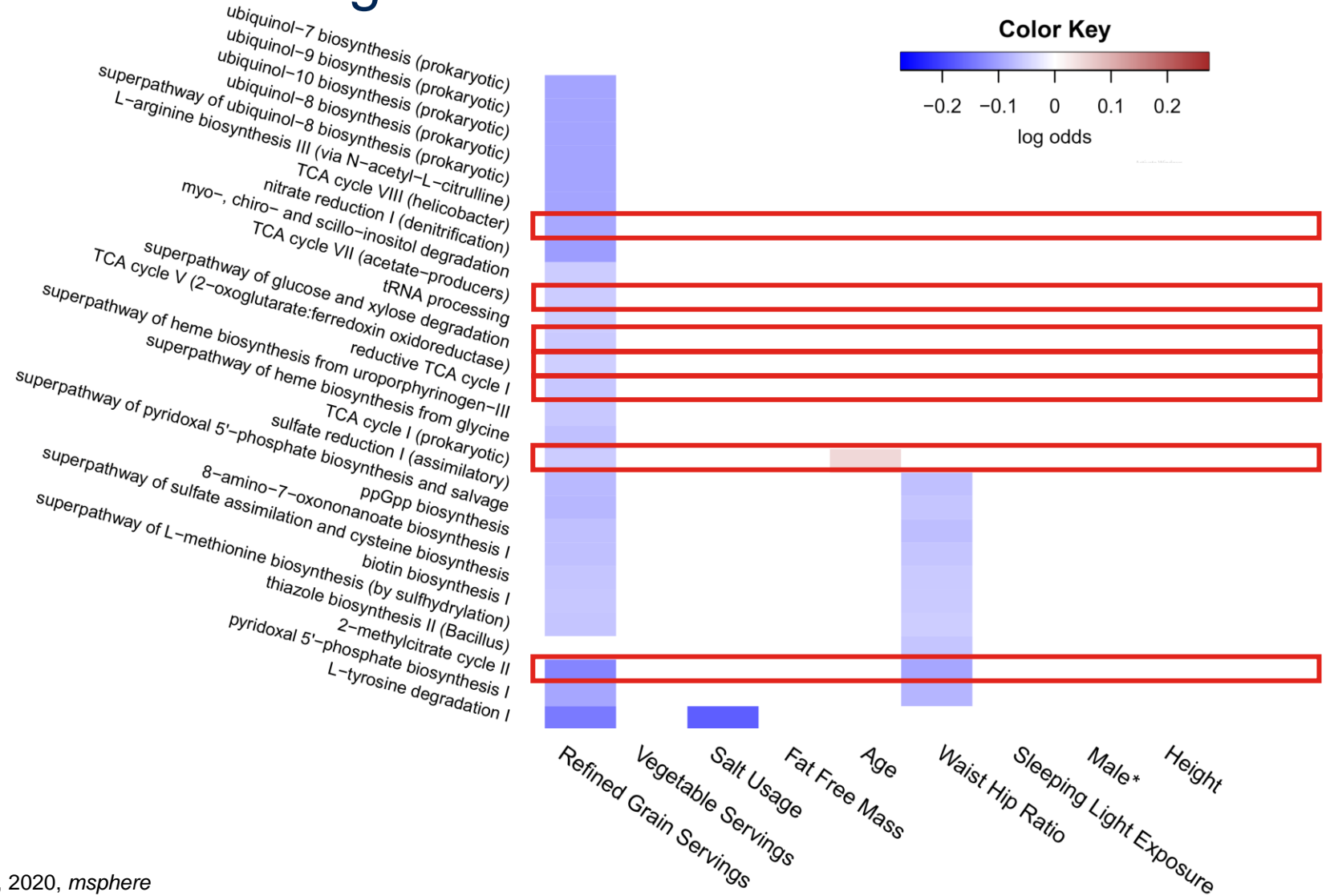
Nearing et al., 2020, *msphere*

Multiple predicted oral microbiome pathways are associated to daily life factors



Nearing et al., 2020, *msphere*

Refined Grain Servings is predicted to be associated with changes in carbon metabolism



Nearing et al., 2020, *msphere*



Summary

- 1) Anthropometric, dietary factors, and some demographics are associated with the oral microbiome
- 2) Each factor explains relatively low amount of variation
- 3) Refined grain usage is linked to potential metabolic changes in oral microbiome



Objectives

- 1) What anthropometric, dietary and lifestyle factors are associated with the oral microbiome?
- 2) Determine the presence of oral microbiome biomarkers in breast, prostate, and colon cancer



Exploring associations between the oral microbiome and cancer

- Cancer free at collection
- Diagnosis from follow-up or cancer registry
- 1:1 case – control matched
 - Sex
 - Age (+/- 2 years)
 - Smoking

Sample Counts



Atlantic
PATH

- 95 Breast
- 46 Colon
- 48 Prostate



- 104 Breast
- 29 Colon
- 80 Prostate

Expected Results/Future Directions

- 1) Oral microbiome risk factors for breast, prostate and colon cancer
- 2) Classify individuals that go on to develop cancer based oral microbiome signature
- 3) Connect oral microbiome data with other CanPath data:

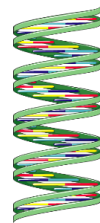
- 1) Heavy metals from toe nails



- 2) Blood metabolites



- 3) Genetic Signatures



Thank You



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Dr. Zhenyu Cheng

Dr. Ketan Kulkarni

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