



Ethnic- and Race-Specific Variations in Carcinoma Microbiomes: A Review

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Introduction

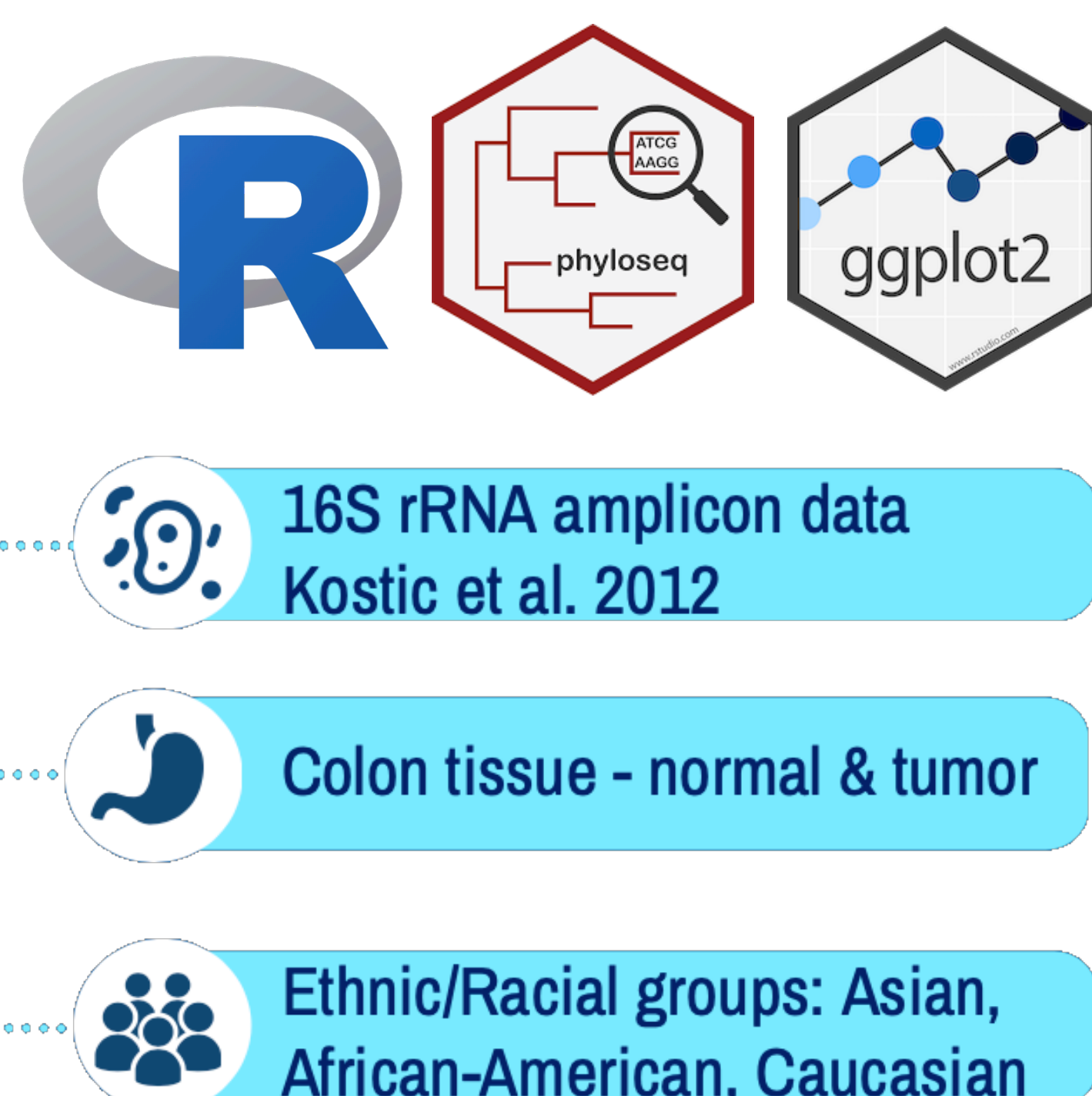
- The **human microbiome** is the **microbial ecosystem** associated with the human body, which **greatly impacts human physiology and health**.
- With the advancement of next-generation sequencing technologies, **human microbiome research** has become a **fast-growing field**, which provides a deeper understanding of complex microbial communities associated with the development and progression of human disease.
- Recent studies have shown that **microbiota differences related to disease (e.g., cancer) often also vary with regards to race and ethnicity**. These findings call for further research looking into the **potential role of the human microbiome in ethnic- and racial related health disparities**. **Ethnic and racial health disparities are generally driven by a multitude of complex factors** (e.g., socioeconomic, psychosocial, dietary, genetic, biological, environmental), which potentially also impact racial and ethnicity-specific signatures in microbiome composition and diversity.

Study Objectives

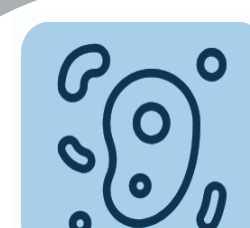
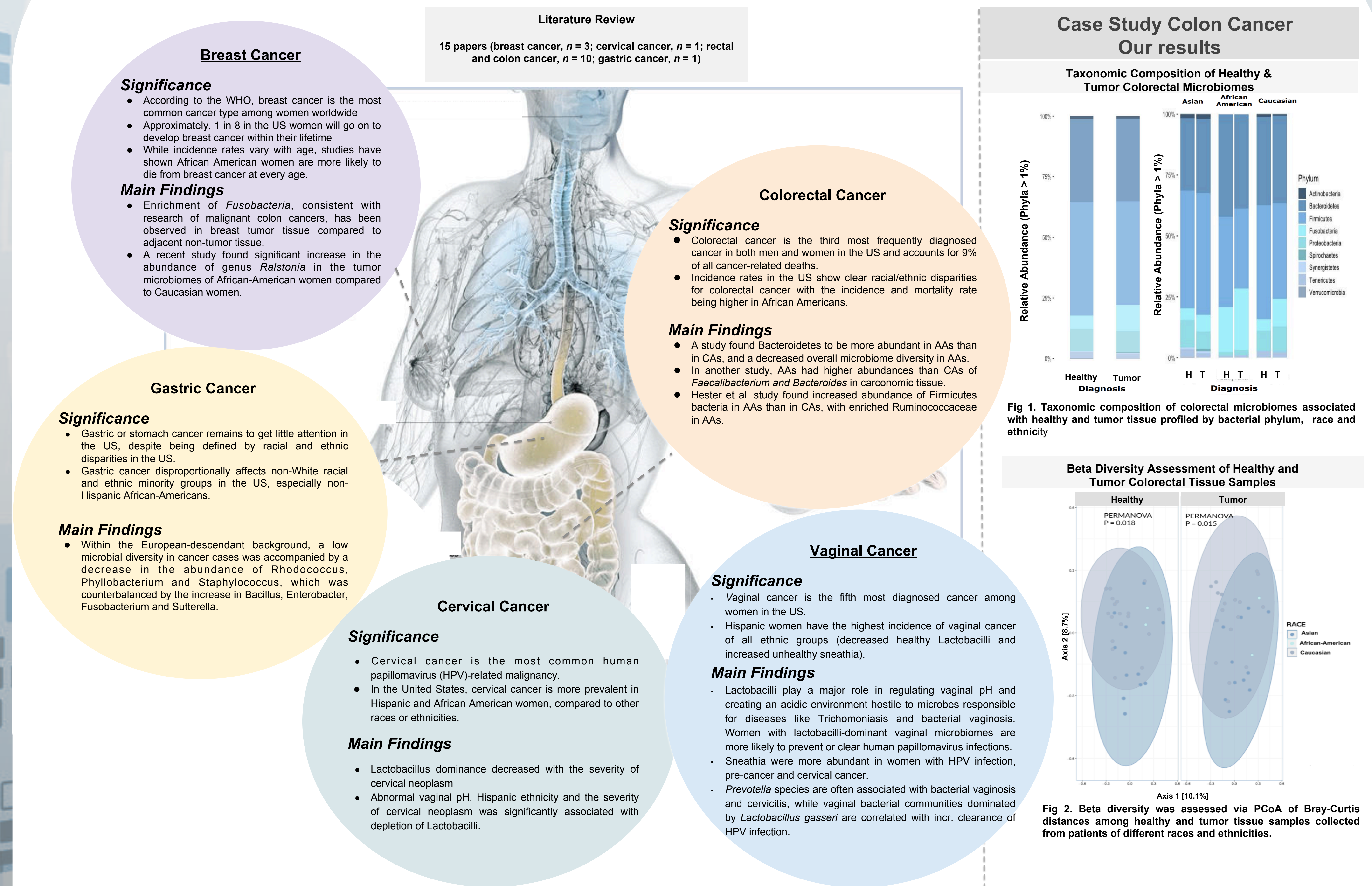
- Cancer** is among the **leading causes of death worldwide** and former research indicated that **incidence rates show clear racial/ethnic health disparities**.
- Here, we **review research on carcinoma microbiomes studied across different human races and ethnicities**, including our **case study on microbiome samples associated with colon cancer tissue collected across several ethnic and racial groups**. **Ethnicity- and race-specific carcinoma microbiome patterns** have so far been described in colon, breast, lung, gastric, pancreatic, rectal and urogenital cancer patients.
- Our review explores race- and ethnicity-specific differences in carcinoma microbiomes and also highlights the **need to conduct more extensive race and ethnicity-specific microbiome profiling in a diverse cancer patient population**, which would greatly contribute to the development of future **race- and ethnicity-specific biomarkers and microbiome-based therapeutic strategies**.



Methods



Carcinoma Microbiomes across Race and Ethnicity



Summary

- Significance:** **Cancer health disparities are an urgent issue worldwide** since minority and underserved populations are disproportionately affected. In the US, large differences in cancer incidence and mortality exist between different ethnic and racial groups, with African-Americans, American Indians, and Hispanic Americans most affected.
- Findings:** Various studies have shown that **microbiome composition and/or diversity are causatively linked to cancer predisposition and development**. Microbiome dysbiosis may cause a higher cancer risk and a modified cancer therapy response. **Ethnic- and race-specific cancer microbiome signatures were described in the breast, colon, stomach, cervix, etc. Although health disparities are not attributable to a single factor and require multidisciplinary research efforts**, differences in microbiota between different races and ethnicities represent a novel way to understand potential drivers of cancer health disparities. Currently, we are still at the **beginning to understand how the microbiome contributes to disparities in cancer risk and survival and further studies are urgently needed**.
- Future Directions:** We recommend conducting **large studies** which also include sufficient sample sizes **from minority populations**. It would be also beneficial to collect patient data on various other factors, such as lifestyle, socioeconomic status, education etc. **Microbiome-centered diagnostics and therapeutics** represent powerful new ways towards understanding and treating cancer. Microbiome profiling is an apt tool for **cancer risk assessment, diagnostics in early-stage cancer detection** and continuous tracking of tumor progression. Furthermore, biomarker screening can inform cancer treatment protocols by **optimizing existing treatment strategies** and through **microbiome-centered therapeutics**. Integrating ethnicity- and race-specific microbiome-based approaches into cancer medicine creates unprecedented opportunities to capitalize on a cutting-edge and constantly evolving field of research which aims to **improve medical precision and patient survival**.

References:
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