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Group-1
For Jan 23, 2026 meeting

What we did:

1. Chose a research question: **Does sex/gender modify the relationship between histological stage and gastric microbiome alpha diversity?**
2. Read Literature to find gap:

- Young Adults with Gastric Cancer Experience Progressive Taxonomic Loss and Broad Functional Decline in the Gastric Mucosal Microbiome | Undergraduate Journal of Experimental Microbiology and Immunology (UJEMI+ 2025 article)
    - Age **DOES NOT** significantly influence gastric microbiome(**alpha** AND **beta** diversity) dynamics during carcinogenesis
    - **Older** patients microbiome does **not differ** across **different stages** of cancer
    - **Younger** patients **lose** taxonomic profile with disease **progression** (looks more similar to older age groups) & **metabolic** ability is **suppressed**
    - Limitation:
        - categorization via age resulted in very limited number of samples (16 young adults, 121 middle aged, 41 elderly), resulting in bias
        - Data from one geographical location + ethnicity
        - Diet was unavailable

- Sex-specific effects of gastrointestinal microbiome disruptions on Helicobacter pylori-induced gastric carcinogenesis in INS-GAS mice | Biology of Sex Differences | Springer Nature Link
    - Paper looked at sex specific effects of H. pylori induced GC on transgenic mice
    - Analysis was done via 16s rRNA and they measured both alpha and beta diversity
    - They found that composition differs greatly between male and female REGARDLESS of H. pylori infection
    - Our gap:
        - They viewed H. pylori induced GC while our dataset is not H. pylori induced
        - They did not look at the same stages of GC found in our dataset
        - Paper looked at mouse models, we have data based on humans

- We did look at other papers, but none looked at sex-specific relationship between histological stage and gastric microbiome alpha diversity. Most papers only looked at 2 of the variables together, did not use 16s rRNA analysis, or used a different type of histological GC progression scale.

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3. Looked at our dataset to see if sample size is big enough for analysis:

Female: **126**

- H.Pylori status: 86 negative + 40 positive
- Histopathology:
    a. 22 Chronic gastritis (CG)
    b. 32 Gastric cancer (GC)
    c. 29 Healthy control (HC)
    d. 22 Intestinal metaplasia
    e. 21 Intraepithelial neoplasia (IN)

Male: **184**

- H.Pylori status: 101 negative + 83 positive
- Histopathology:
    a. 16 Chronic gastritis (CG)
    b. 52 Gastric cancer (GC)
    c. 30 Healthy control (HC)
    d. 32 Intestinal metaplasia
    e. 54 Intraepithelial neoplasia (IN)

What we want to discuss:

- Can we do our chosen question based on this work currently done?

What we want to do:

- Start the project