

Host and Microbiome Interaction along Colorectal Cancer development

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What is known in the field?

- Imbalance of microbiome (termed as dysbiosis) has been associated with colorectal cancer (CRC) and its precursor, adenoma.
- The dysbiosis is found in oral, colorectum mucosal and stool samples.
- Mucosal and stool dysbiosis differ in patients with adenoma and CRC, suggesting that stool dysbiosis does not represent the mucosal dysbiosis where the malignancy occurs.

What is not known in the field?

- How does the dysbiosis interact with the host mucosa, leading to the development of adenoma and CRC?

Experimental designs

A. Studying the Ecology of Host-Microbe interactions during CRC development

1. Human Biopsy Sample Collection

- Polyps at different stages of adenoma or CRC
- Adjacent normal tissues

2. Animal Models

- Azoxymethane (AOM) induced CRC model
 - Collect Polyps and normal tissues
- CPC:APC genetic CRC model
 - Collect Polyps and normal tissues

3. Perform Multi-omics Analyses

B. Verifying the Host-Microbe interactions

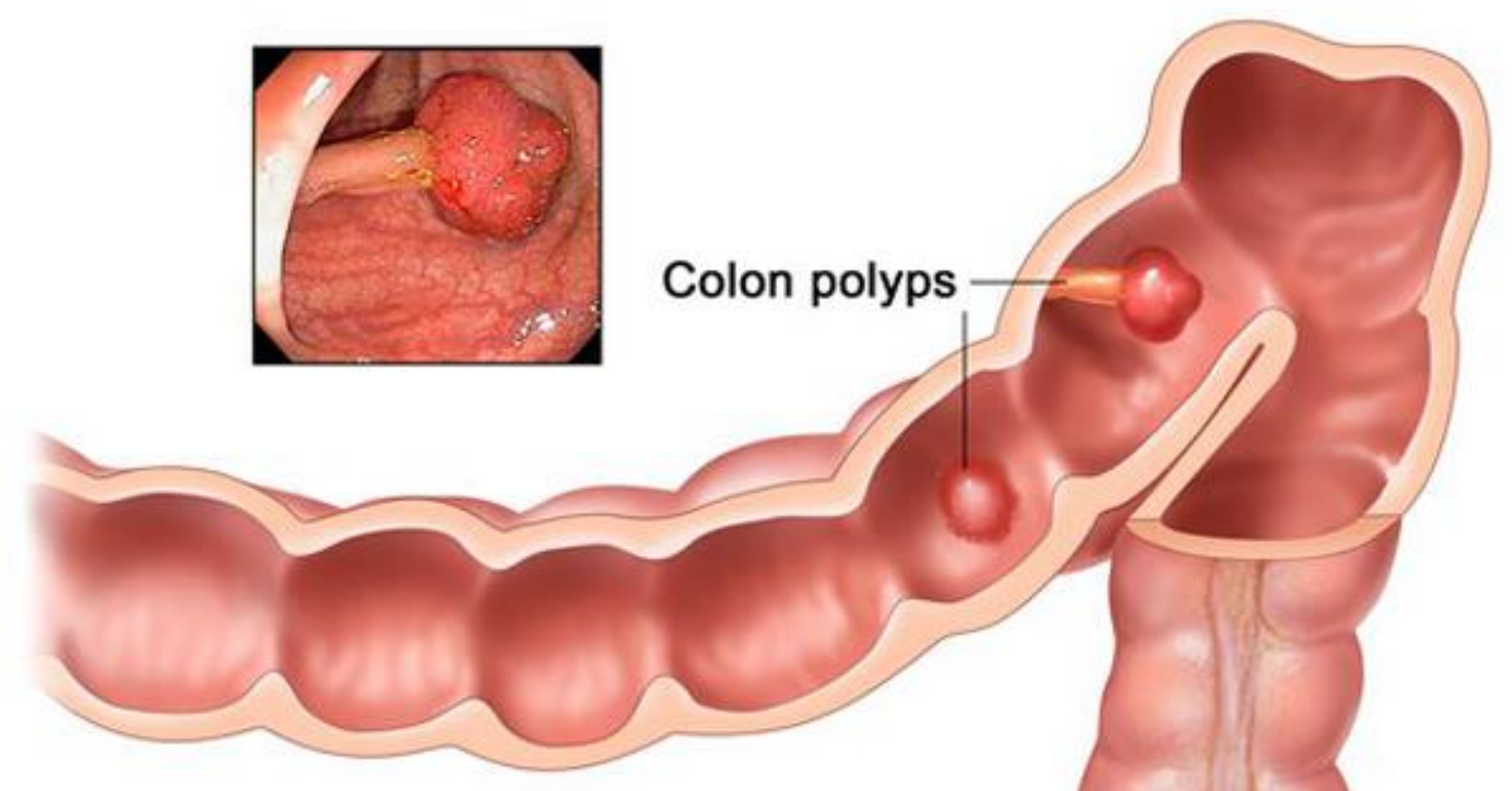
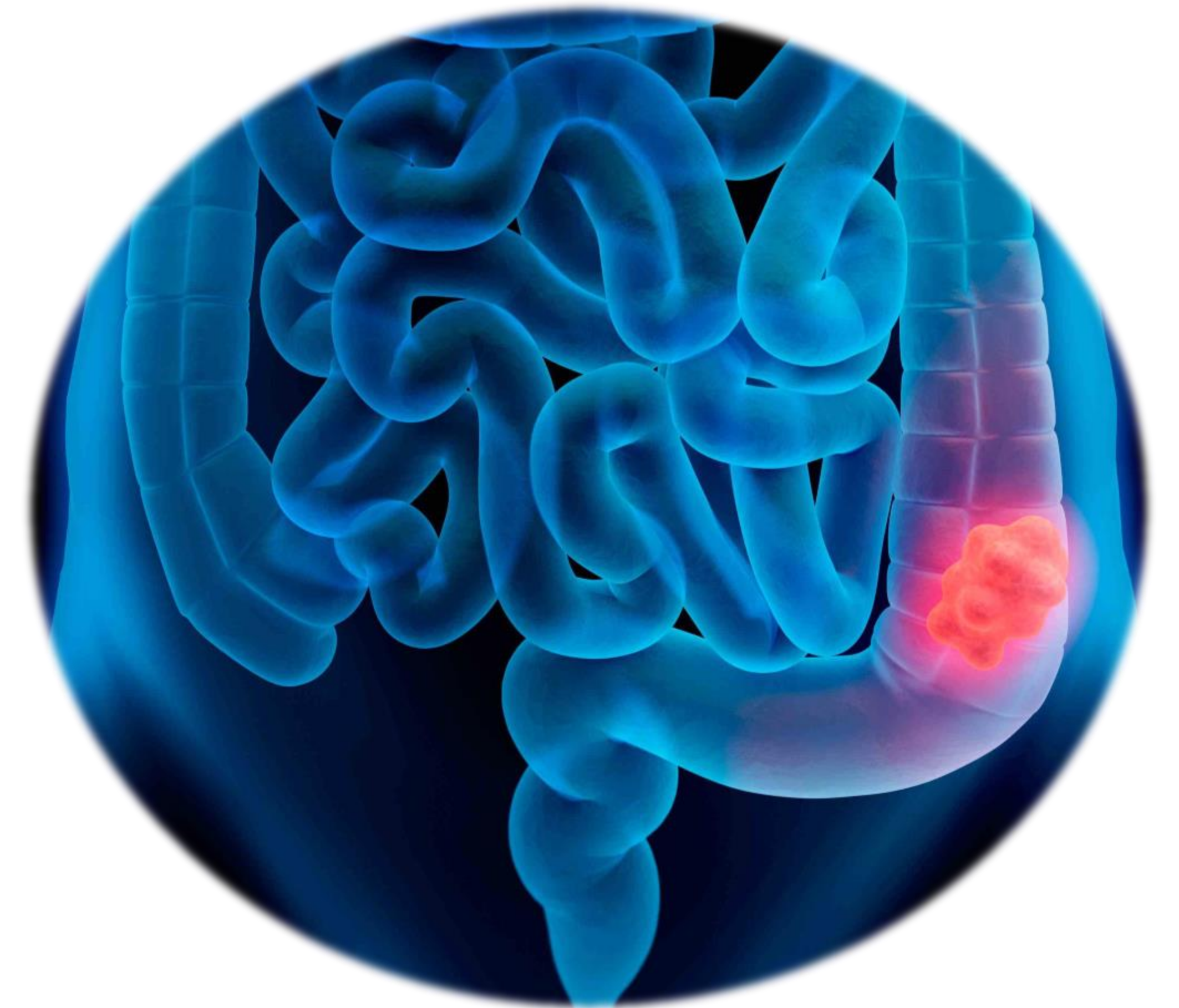
1. In vitro studies (Microbes-cell line co-culture)
2. In vivo studies (Microbiota transplantation)
3. Perform multi-omics analyses

Project Availability:

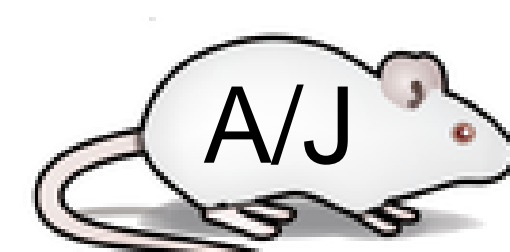
- Hons Project (Study A)
- Master/PhD Project (Study A + B)

Student involvement in the project

- Animal handling
- Animal Colonoscopy and biopsies
- Human sample collection
- Immunohistochemistry/Imaging
- DNA / RNA extraction
- Next-generation Sequencing/Omics analysis
- Bioinformatic analysis



Model 1



PBS/AOM

Model 2



Birth

Biweekly colonoscopy + biopsies

CPC:APC or
APC^{+/loxP}



What we have:

- ✓ Approved ethics
- ✓ Animal models of CRC
- ✓ Most of the samples have been collected
- ✓ Expertise in animal work, bioinformatics and microbiome

Contact:

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References and Sources:

- 1: National Cancer Institute
- 2: Becker et al., 2006 Nature Protocol
3. <https://www.roswellpark.org/cancertalk/201904/top-myths-about-colon-cancer-debunked>