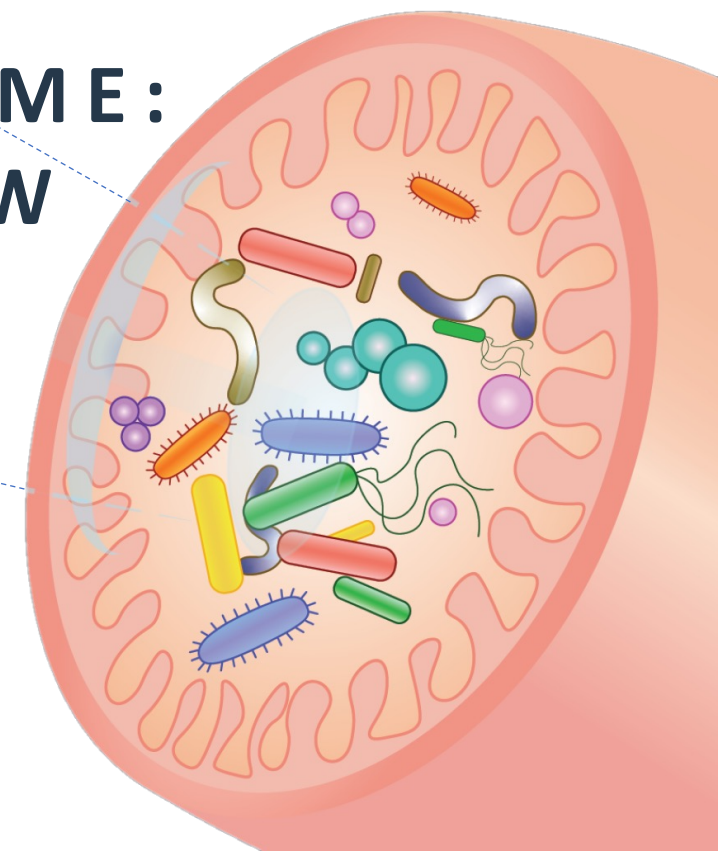
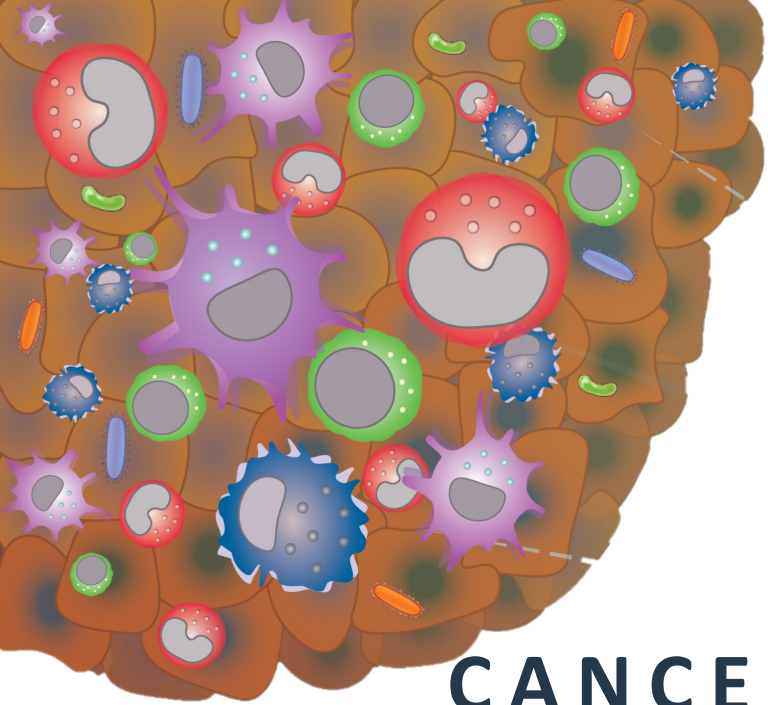


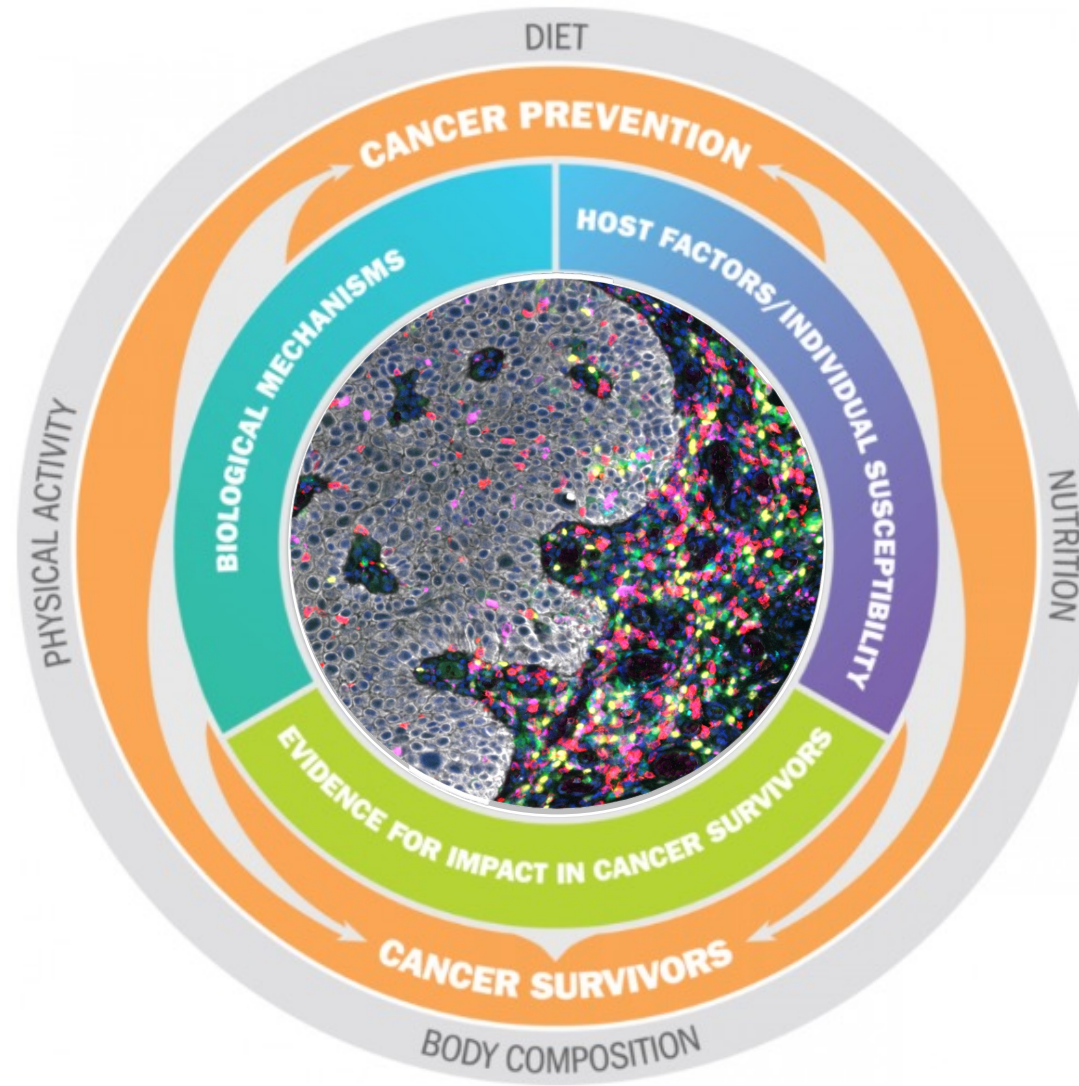


CANCER AND THE MICROBIOME: WHAT YOU NEED TO KNOW

DR NICOLA ANNELS
SENIOR RESEARCH FELLOW



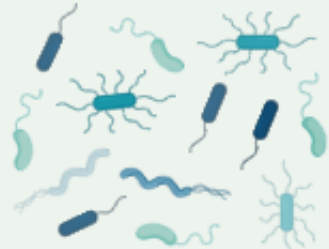
LIFESTYLE FACTORS CONTRIBUTING TO CANCER PREVENTION AND SURVIVORSHIP



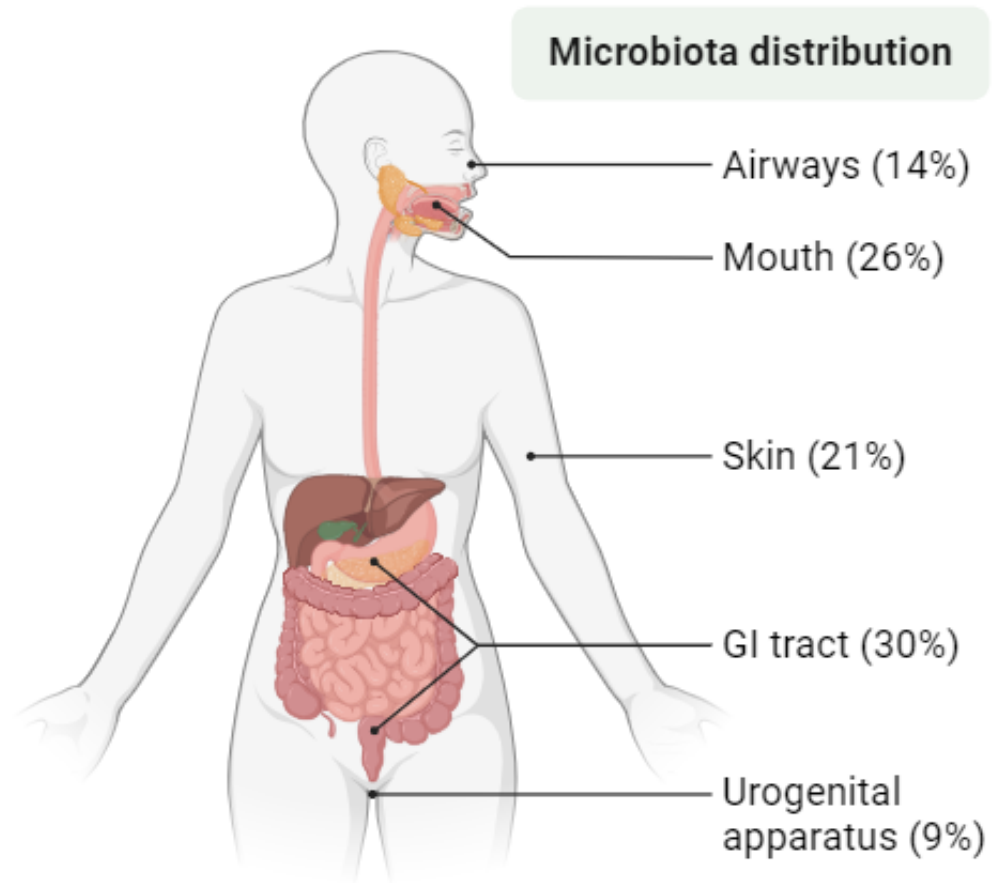
WHAT IS THE MICROBIOME?

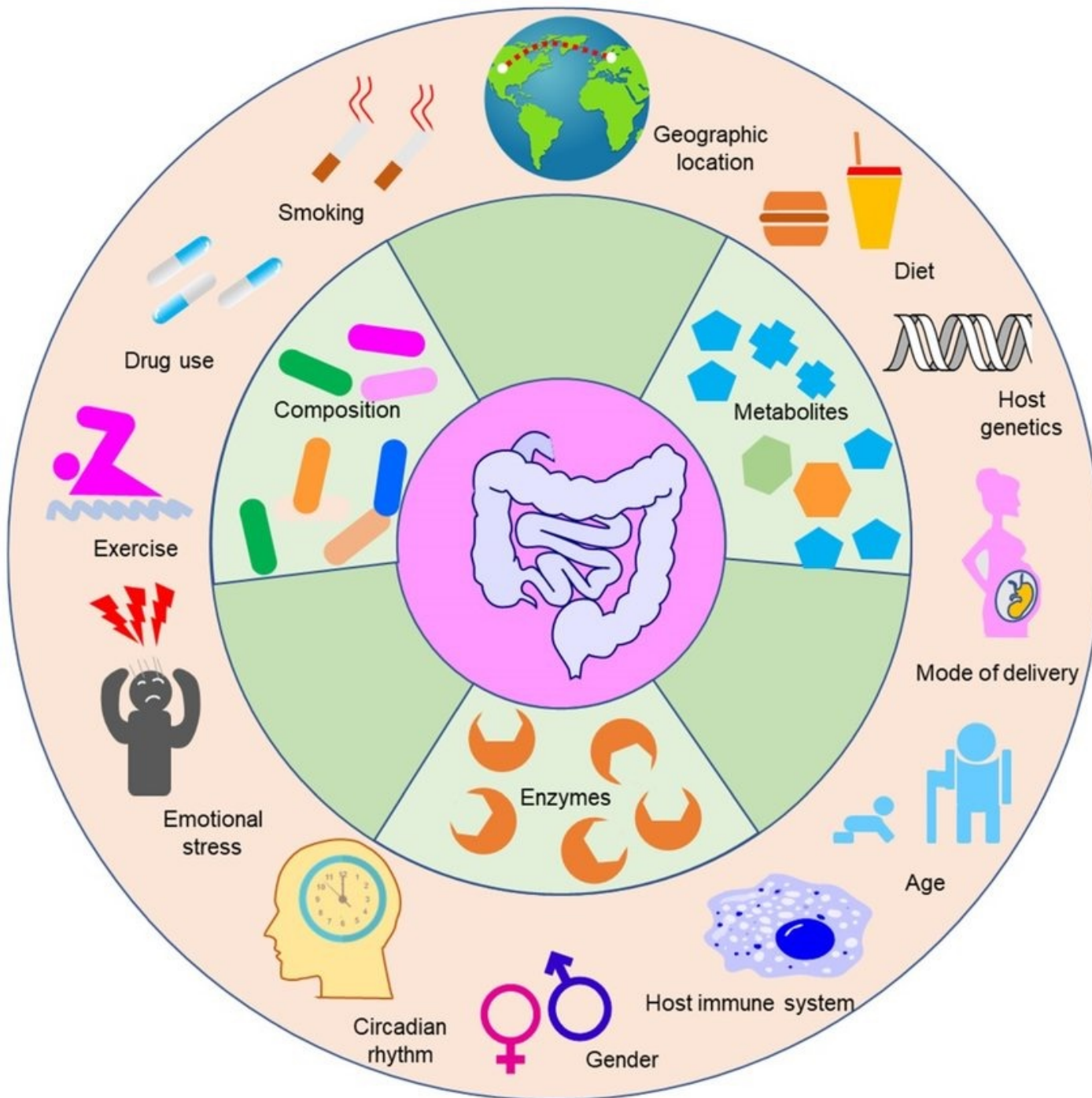


More bacteria reside in human body than the actual human cells. It is estimated that the ratio of microbes to human cells is 1.3:1!



There are 10-100 trillion symbiotic bacteria in the human body, and >10,000 species



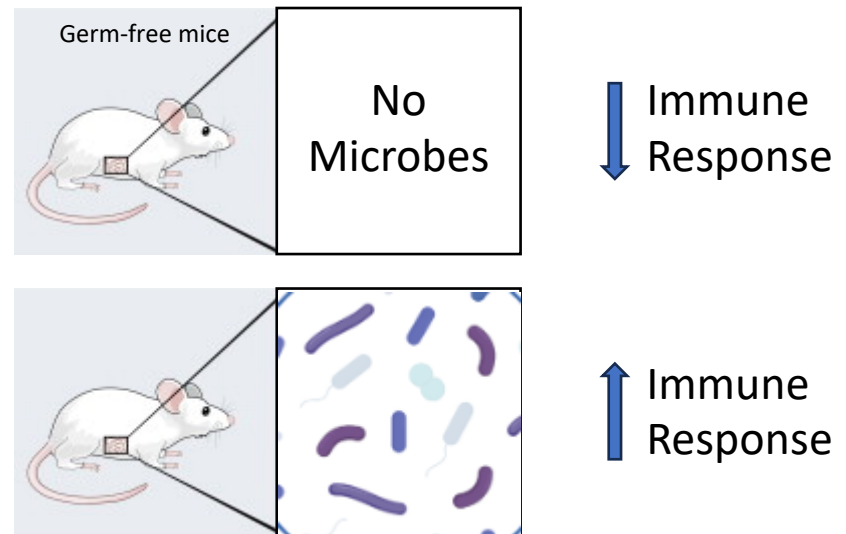
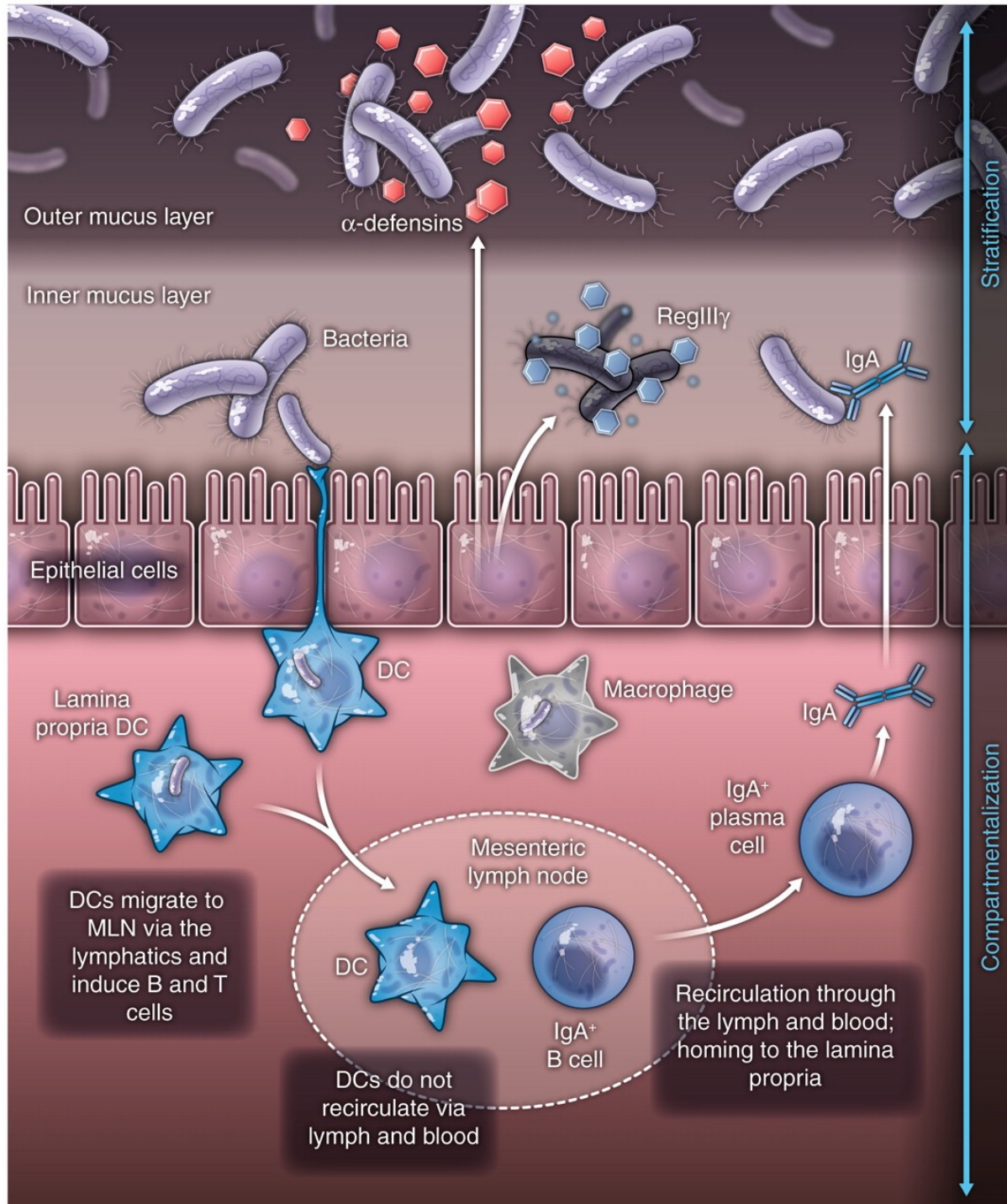


FACTORS INFLUENCING
THE COMPOSITION AND
FUNCTION OF GUT
MICROBIOTA.

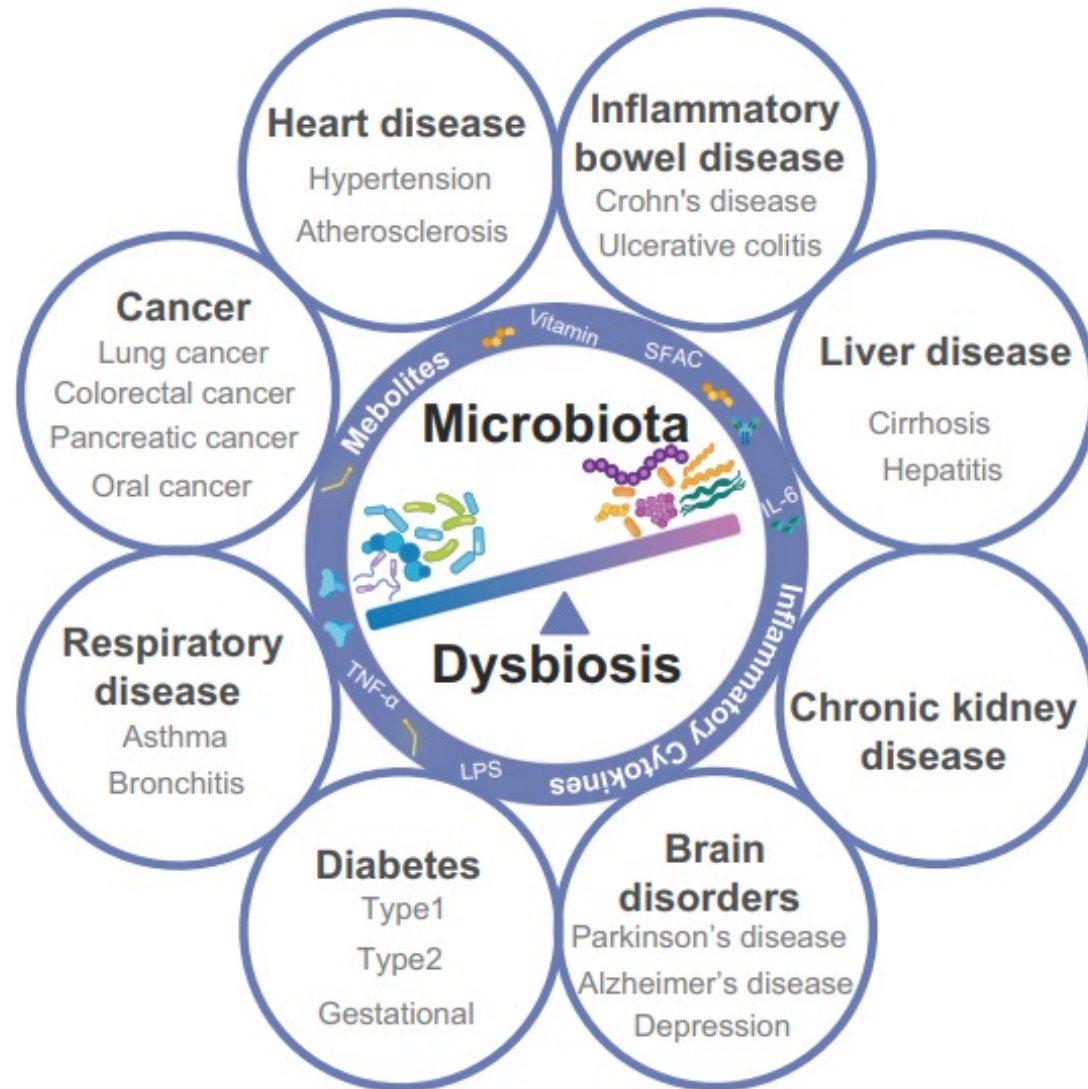


THE MICROBIOME AND THE IMMUNE SYSTEM ARE CRITICALLY INTERTWINED

What microbiota are present in the gut determines what education immune cells get.

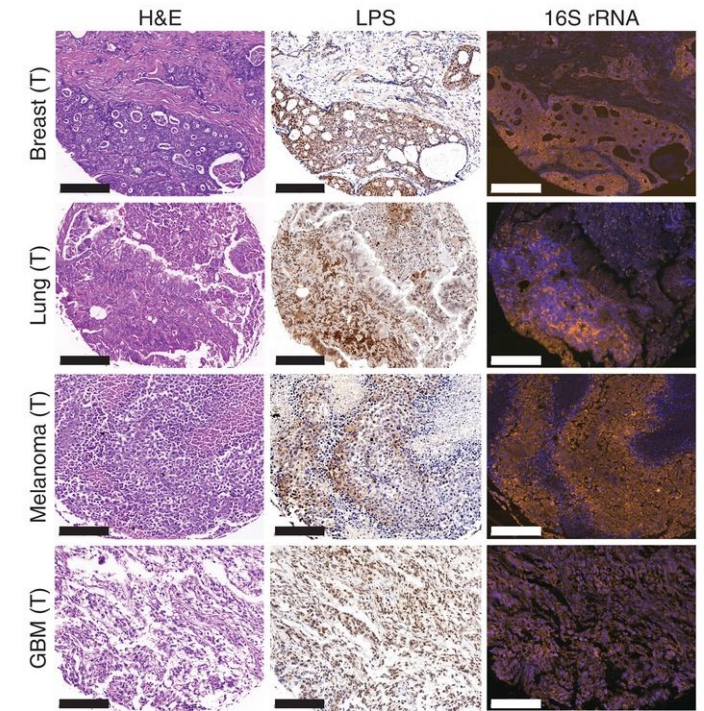
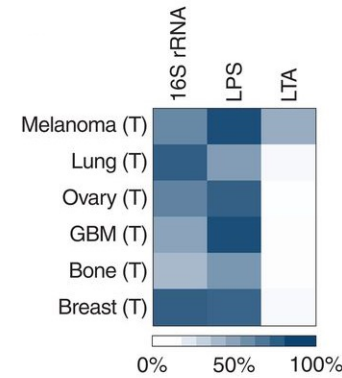
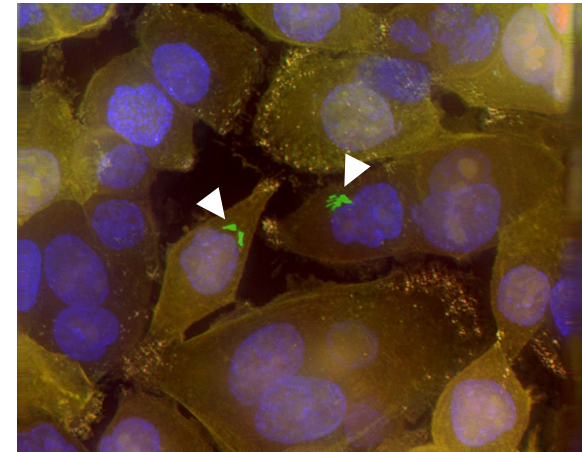
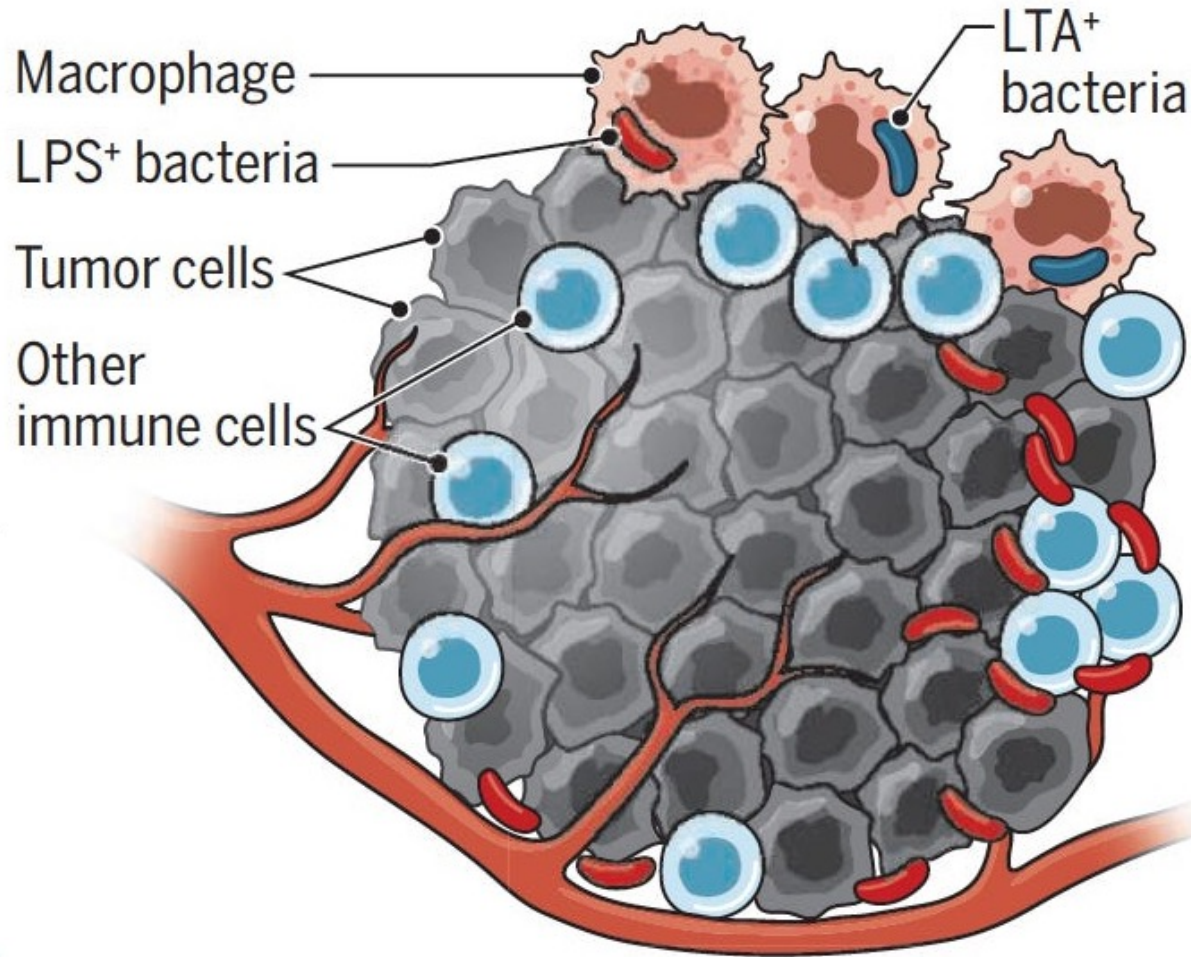


HUMAN MICROBIOTA DYSBIOSIS CONTRIBUTES TO VARIOUS DISEASES



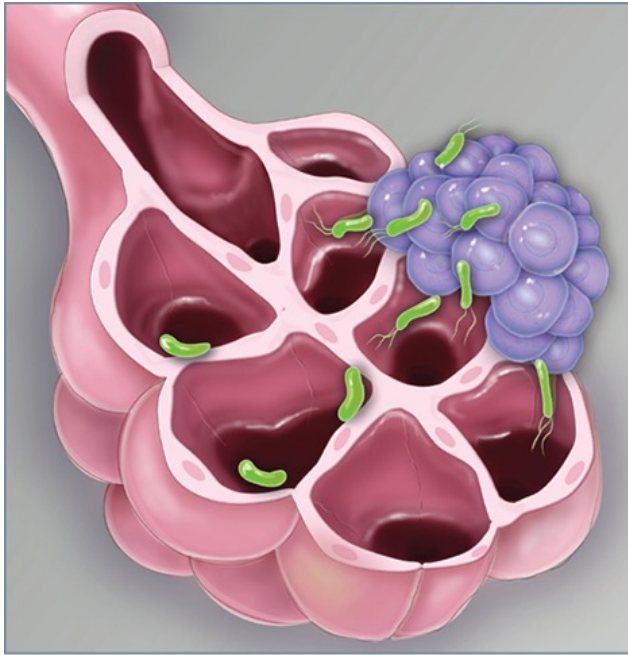
- Loose beneficial bacteria
- Potentially more harmful bacteria taking over your gut
- Less diverse bacteria in your gut

MICROBES THAT LIVE INSIDE TUMOURS

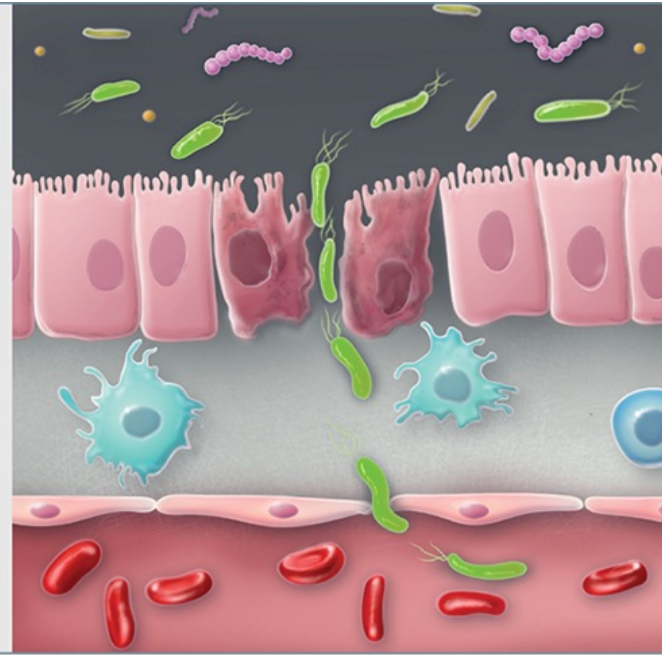




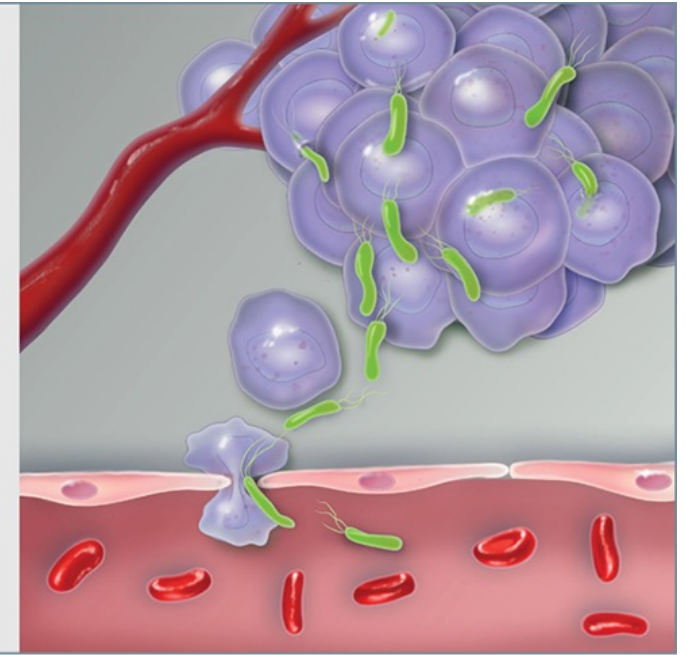
WHERE DOES THE TUMOUR MICROBIOME COME FROM?



Local spread of commensal bacteria in healthy tissue



Translocation of bacteria across the gut epithelium into circulation, often due to cancer treatment



Metastatic spread of bacteria alongside tumor cells

POSSIBLE CLINICAL USES OF MICROBIOMES IN CANCER



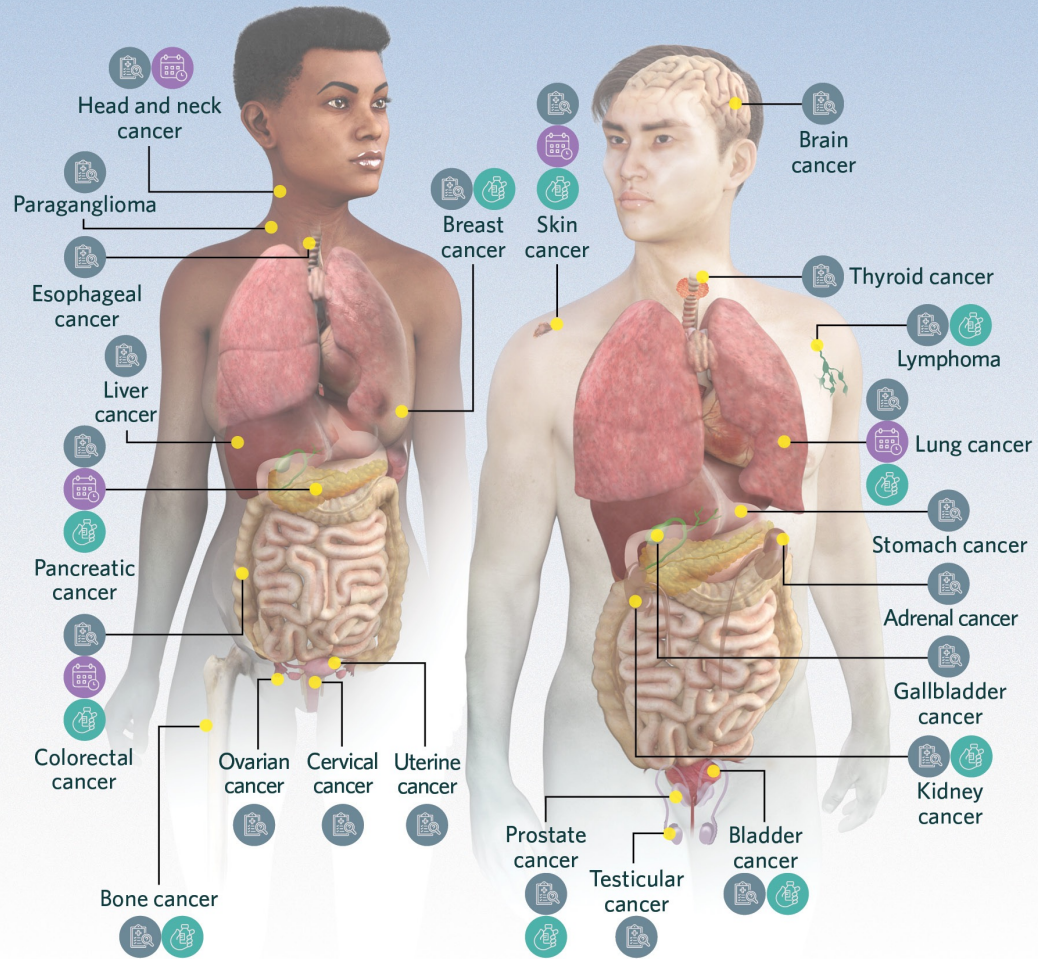
Diagnosis



Prognosis



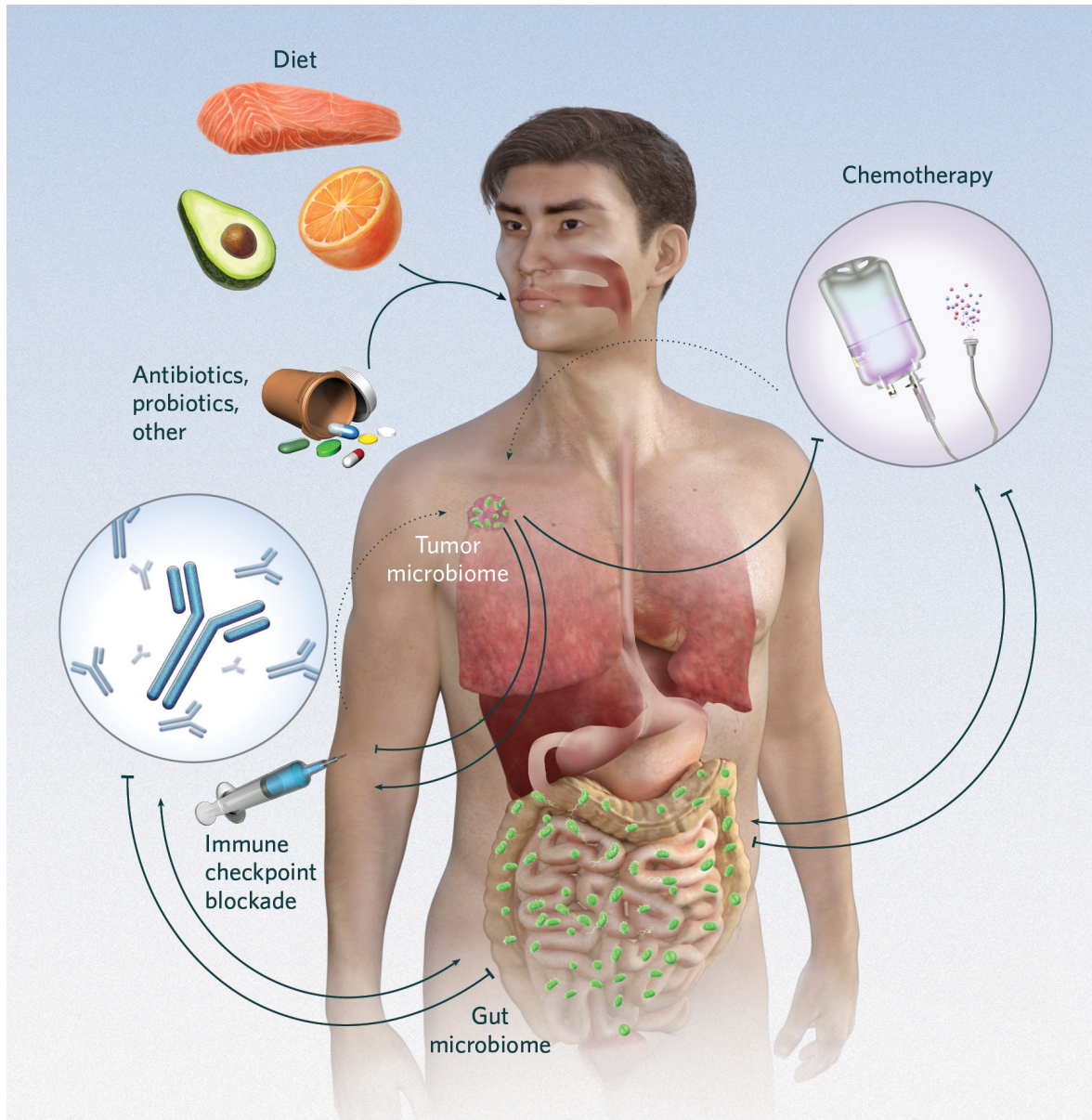
Response to treatment



MICROBIAL SIGNATURES OF CANCER

- Do the microbes play a role in the development of the tumour in the first place?
- Are they simply opportunistic residents that have adapted to protect their cancerous home when they find one?
- Can this microbe community be harnessed to help us in our fight against cancers?

- correlations between microbial signatures in these tissues and a patient's diagnosis, prognosis, or response to treatment, which could one day help inform clinical care.

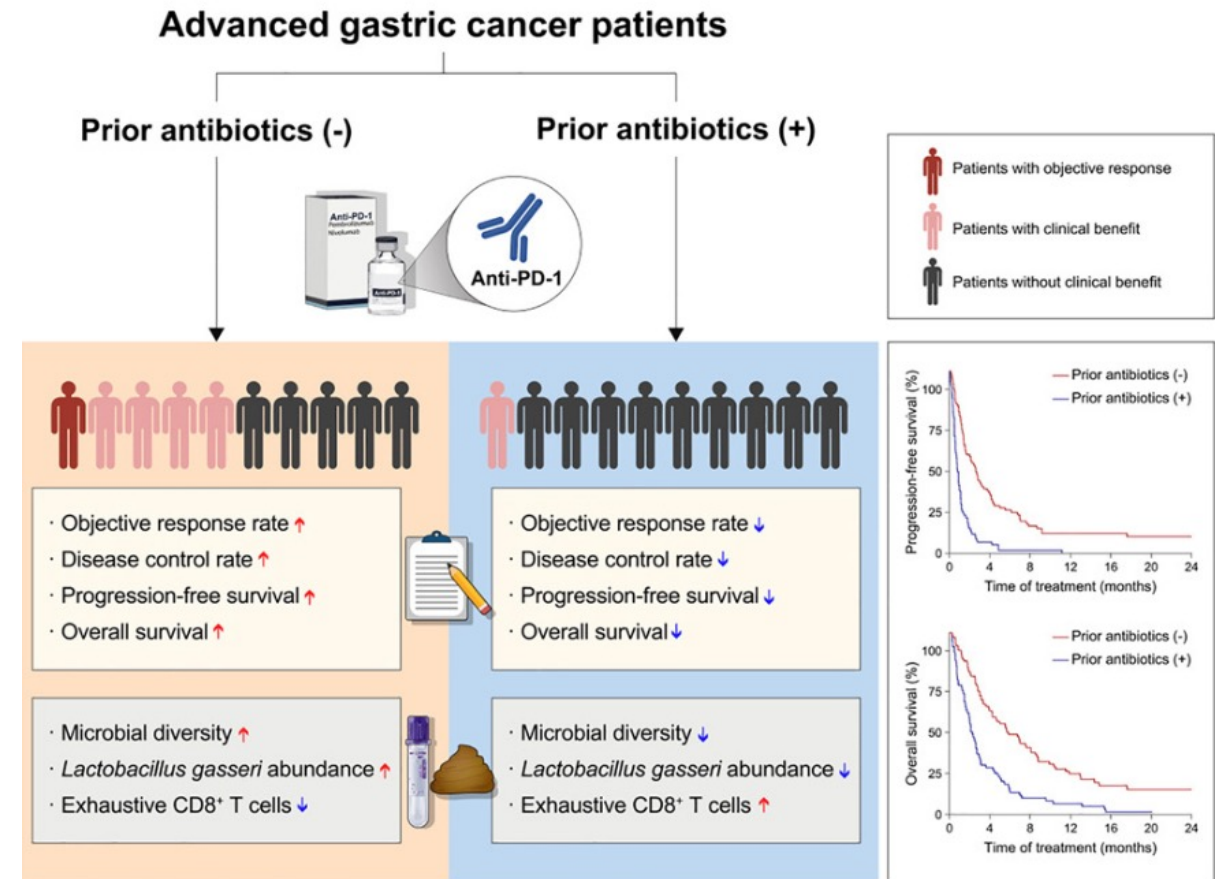
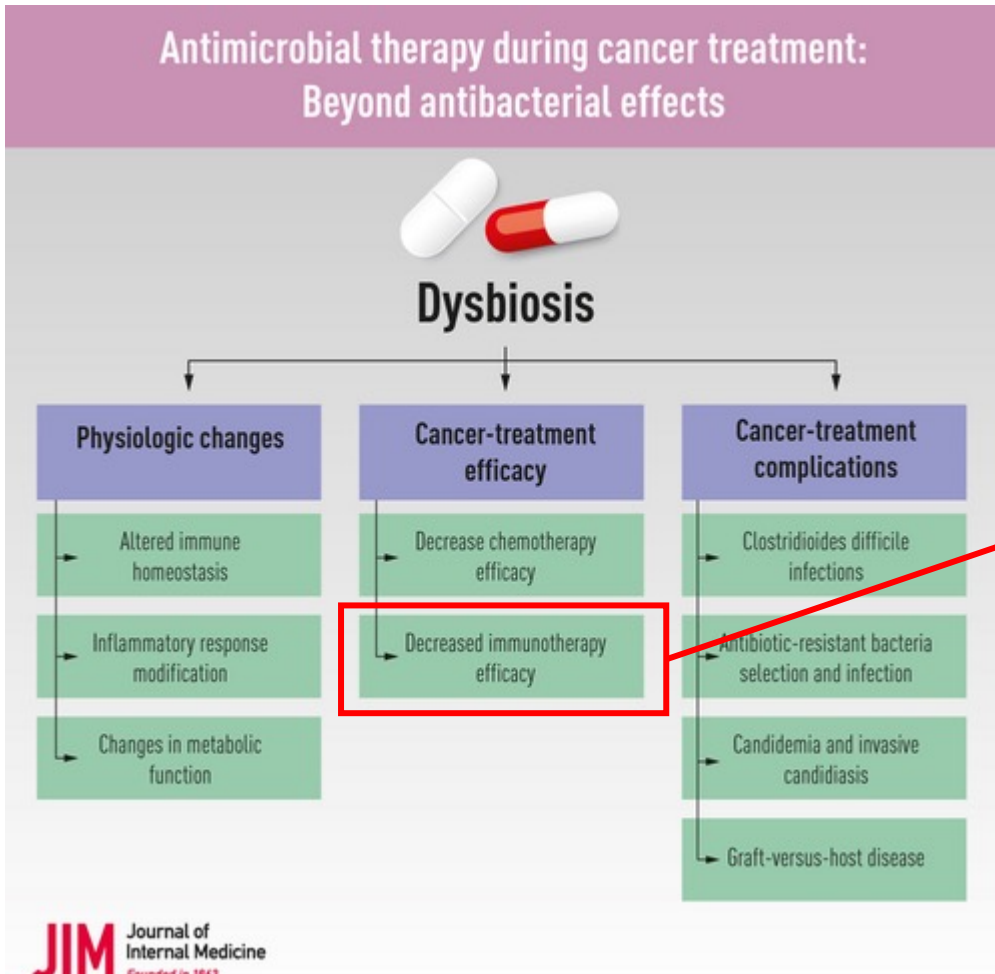


MICROBE - CANCER INTERACTIONS

Bacteria and other microbes living in tumours or in the guts of cancer patients may influence their responses to treatment.

- Bacteria living inside cancers can protect tumours by inactivating chemotherapy drugs
 - Gammaproteobacteria breaks down gemcitabine, tumours become resistant to the drug

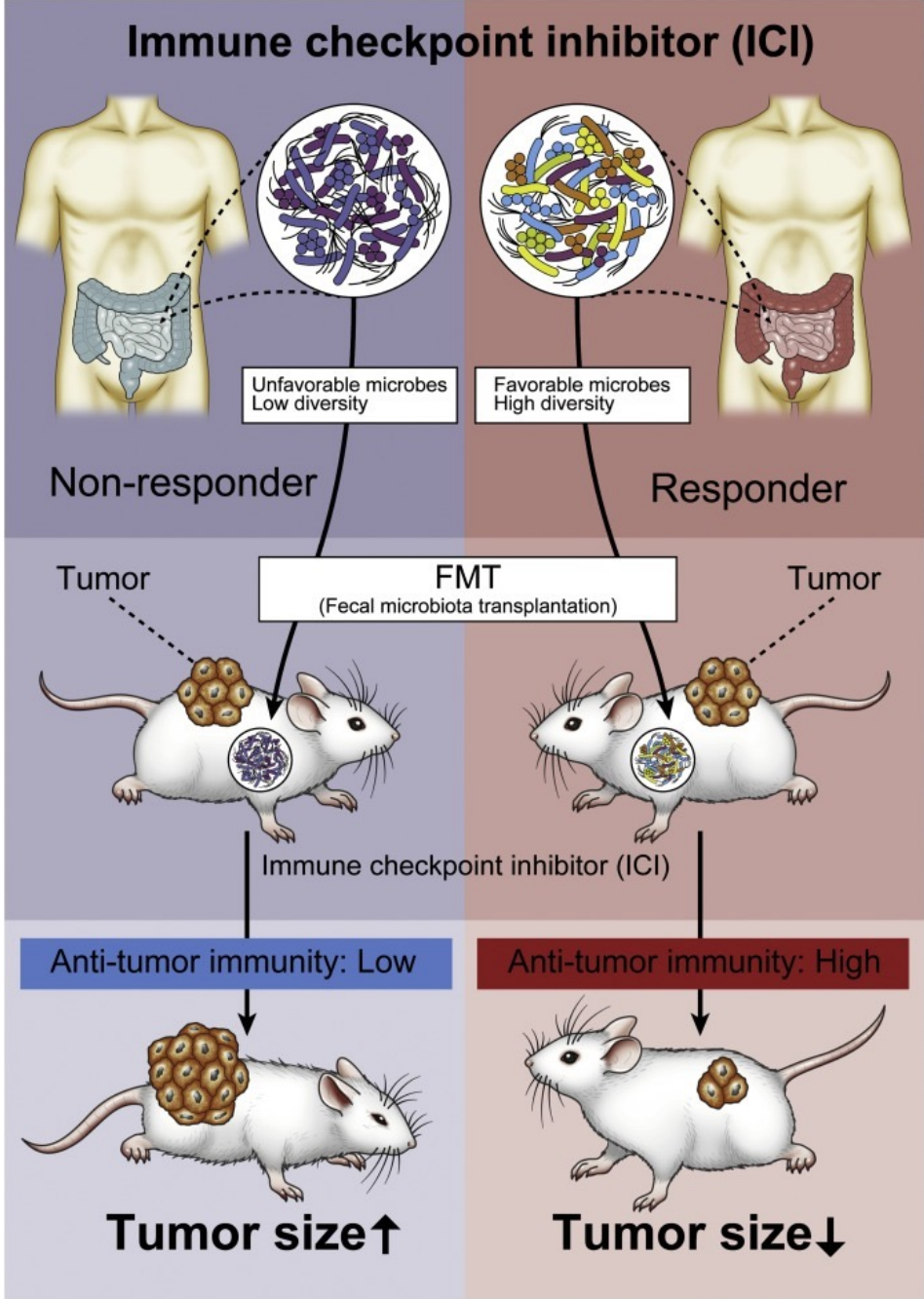
ANTIMICROBIAL THERAPY DURING CANCER TREATMENT



Kim et al., 2023, Cell Reports Medicine 4, 101251



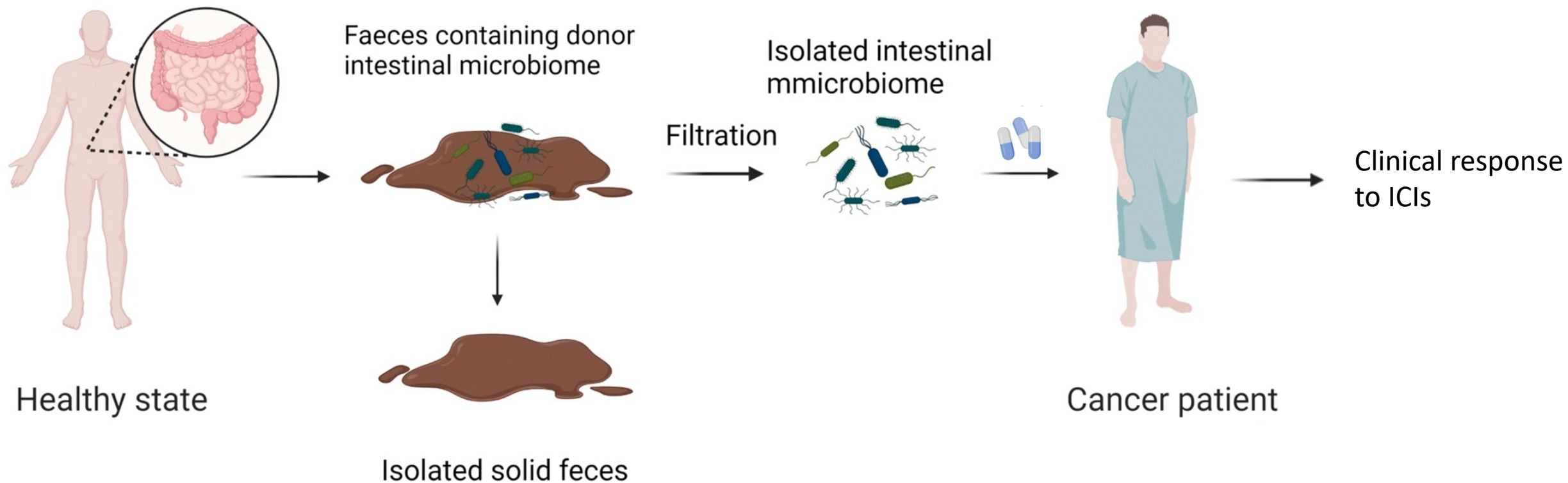
THE MICROBIAL COMPOSITION OF THE GUT INFLUENCES WHETHER A PATIENT WILL BENEFIT FROM IMMUNOTHERAPY

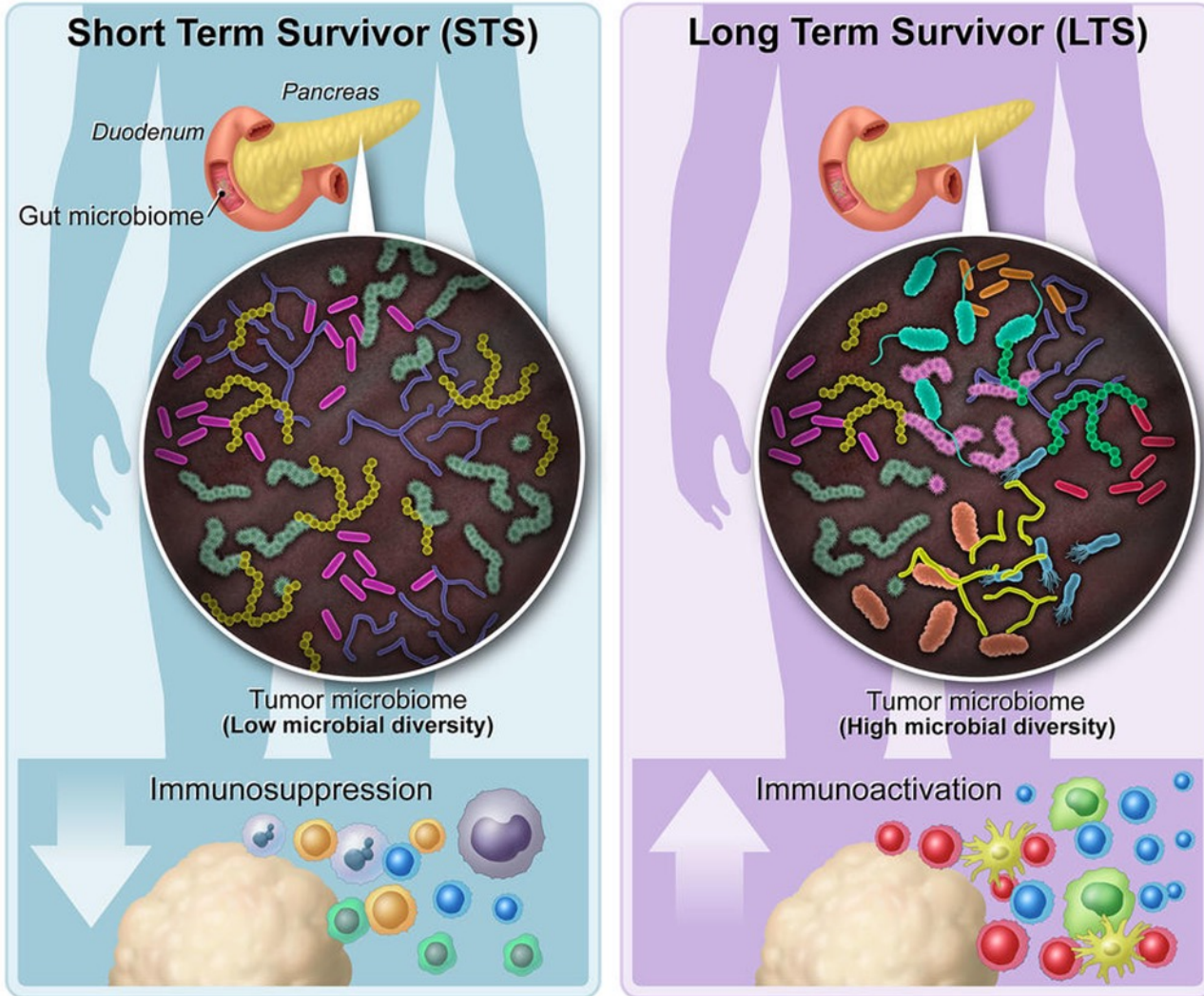


THE MICROBIAL COMPOSITION OF THE GUT CORRELATES WITH THE RESPONSE TO IMMUNE CHECKPOINT INHIBITORS



Fecal Microbiota Transplantation



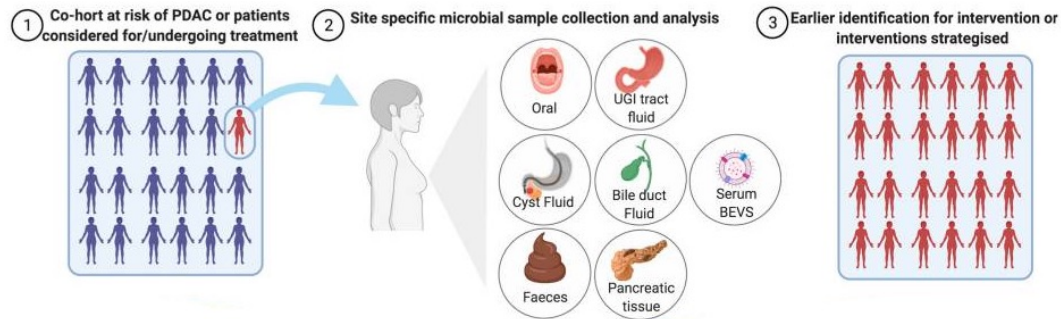


TUMOUR MICROBIOME
DIVERSITY AND
COMPOSITION INFLUENCE
CANCER SURVIVAL
OUTCOMES



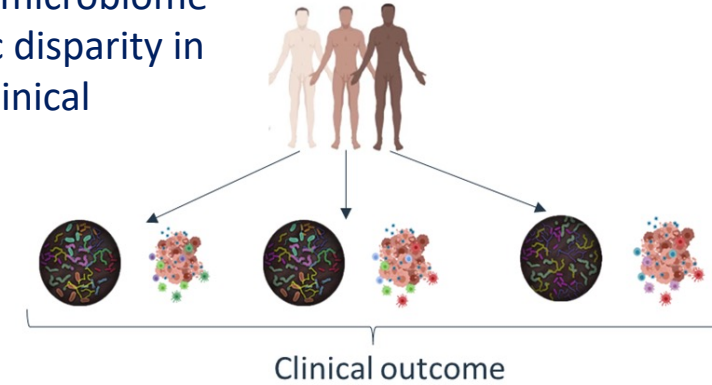
PANCREATIC CANCER

Investigating the potential role of microbial biomarkers in pancreatic cancer



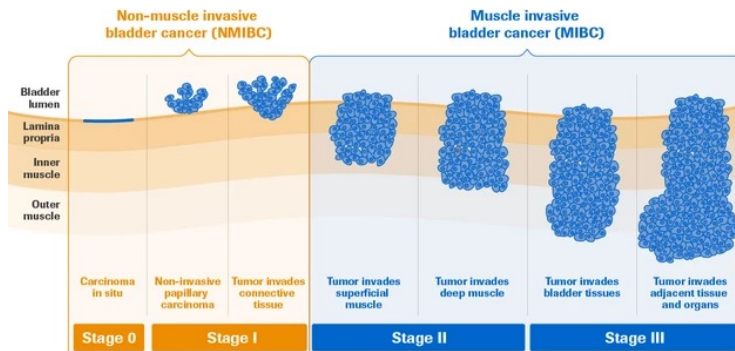
PROSTATE CANCER

Does the tumour microbiome explain the ethnic disparity in prostate cancer clinical outcomes?



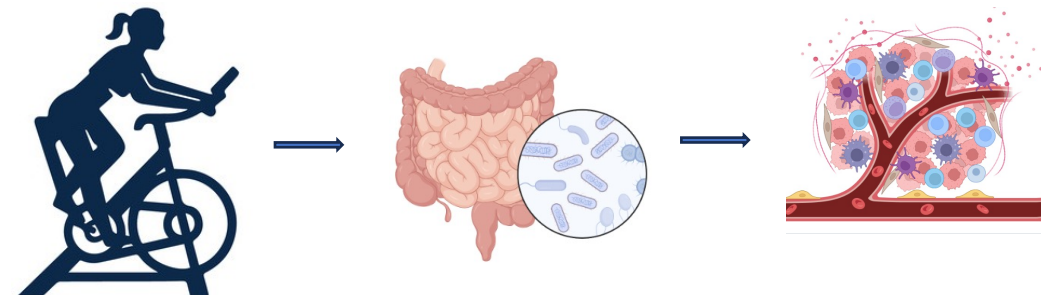
BLADDER CANCER

What is the role of the microbiome in bladder cancer progression?



OESOPHAGEAL CANCER

Can exercise increase gut microbial diversity leading to enhanced anti-tumour immune responses?



CANCER AND THE MICROBIOME: WHAT YOU NEED TO KNOW



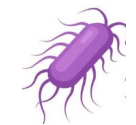
Microbes can both promote and inhibit cancer and affect cancer treatment success



Different cancers have different tumour microenvironments which is reflected in the microbes that have adapted to live there



Having a species rich and diverse microbiome increases the chance of harbouring anticancer microbes that would act against tumour and tumour-promoting microbes



Certain microbes can stimulate an anti-tumour immune response and thus promote immunotherapy success

By understanding the role that microbial communities play in cancer we aim to advance personalized medicine in the future to improve cancer detection, treatment and prognosis of cancer.