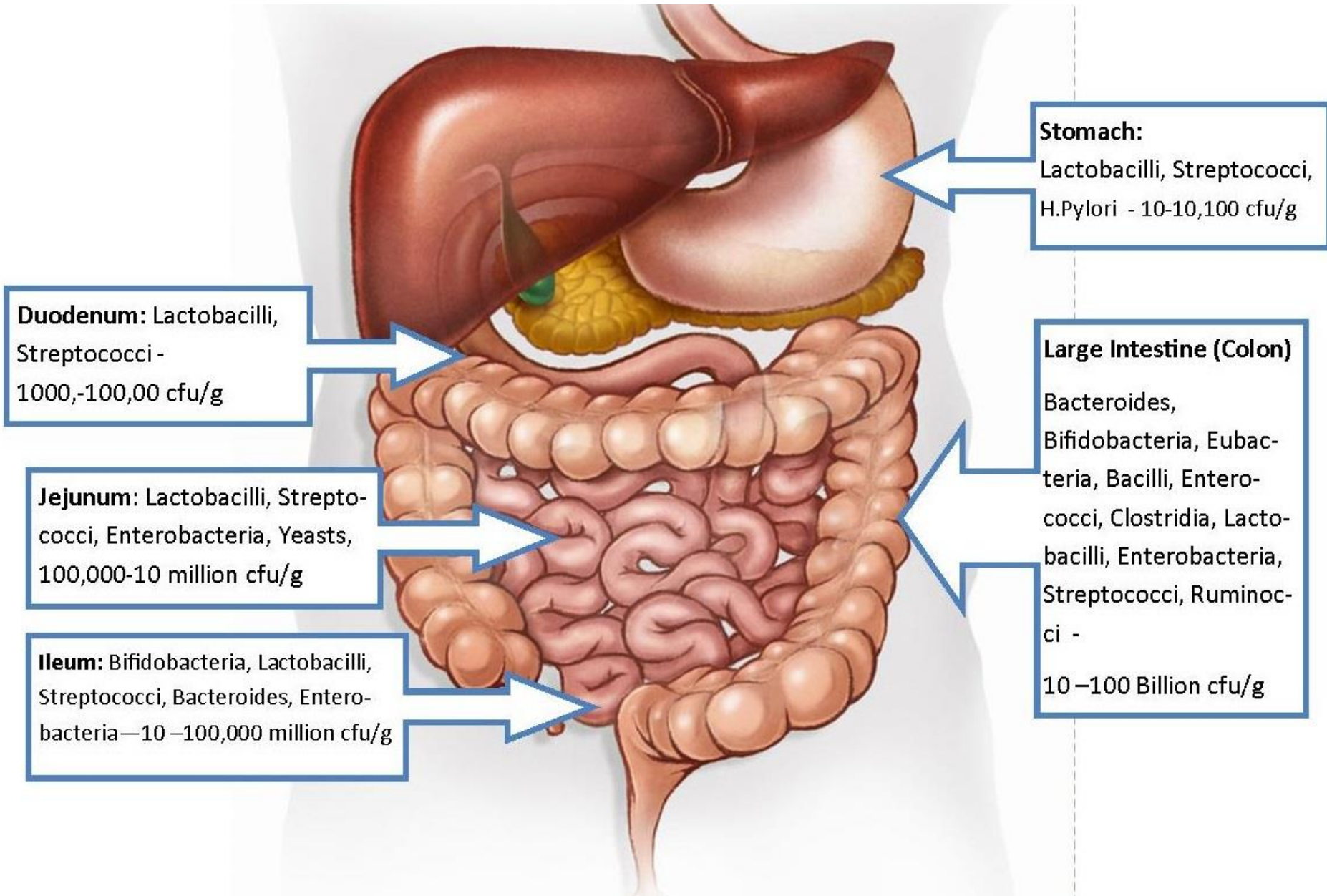


INTRODUCING YOUR GUT BACTERIA



Microflora

- Intestinal flora 1.5 kg
- We would die with 5 years of birth if we did not have them as we would not develop a proper immune system
- 1000 species and 5000 strains
- 100,000 billion viable microbes in the intestines
- 1000 billion viable microbes on the skin

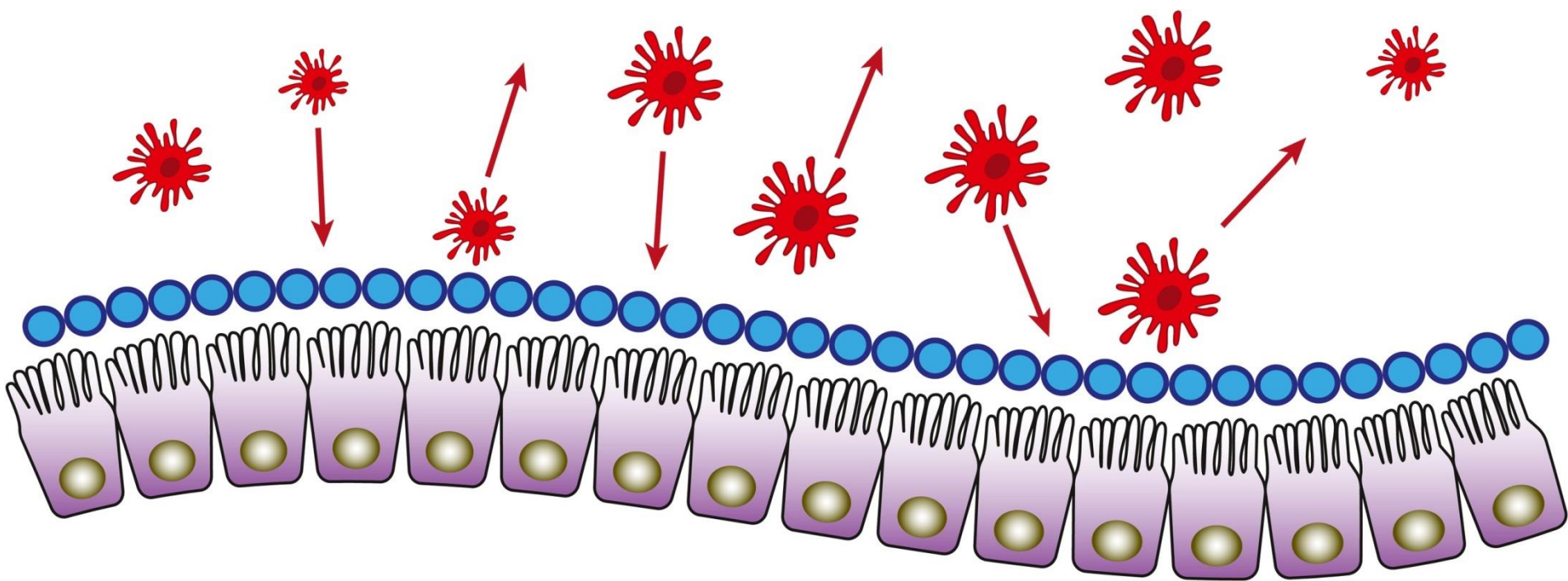


Microflora

- Think of it as another organ
- Anywhere we have a mucosal surface we have good bacteria – oral cavity, respiratory tract, gastrointestinal tract , genito-urinary tract, skin
- Very complex dynamic community
- 80% of our immune system is in the gut and in constant communication with the microbiota

Gut Microflora

- 50 % of poo consists of bacteria
- Microflora produces 2 litres of gas per day
- Carpet of micro-organisms on the epithelial layer protects bad bacteria from entering
- Yeast can only cause problem if the yeast can attach to receptor – good bacteria can protect the layer and prevent attachment.
- Acquisition of resistance to antibiotics occurs in the intestines



What is Normal Microflora?

- It is the microbes that resides within the human gastrointestinal, urogenital tract and skin.
- It is both persistent and stable and under normal circumstances, does not elicit an acute immune response
- It represents 85 % of the total microbes in the gastro intestinal system
- Good bacteria in the GIT migrates to colonize the urogenital tract

Types of Organisms in The Gut

- Prokaryotes: bacteria and archaea (have a synergistic relations with bacteria and can aid digestion)
- Bacteriophages (viruses that infect prokaryotes)
- Eukaryotic viruses (infectious agents that replicate inside living cells)
- Meiofauna (primarily fungi and protozoa)

Immune tolerance

- We have immune tolerance to good bacteria just like we do to baby during the pregnancies and ourselves
- If we develop an intolerance to the good bacteria
→ inflammation and chronic conditions of colitis, Crohn's etc.
- Resolving allergy and autoimmunity is re-establishing immune tolerance to bacteria

The Normal Human Microflora-Adult

- The intestinal microflora reaches its adult composition and is fully formed by age 2
- How it develops is dependent on baby consuming all the major food groups during this time and environmental and genetic factors
- Residential bacteria potential is also set by age 2



Residential Flora

- Is acquired rapidly during & after birth
- Changes continuously through out life
- Reflects age of person
- Reflects nutrition of person
- Reflects genetics of person
- Reflects environment of person
- Reflects sex of person

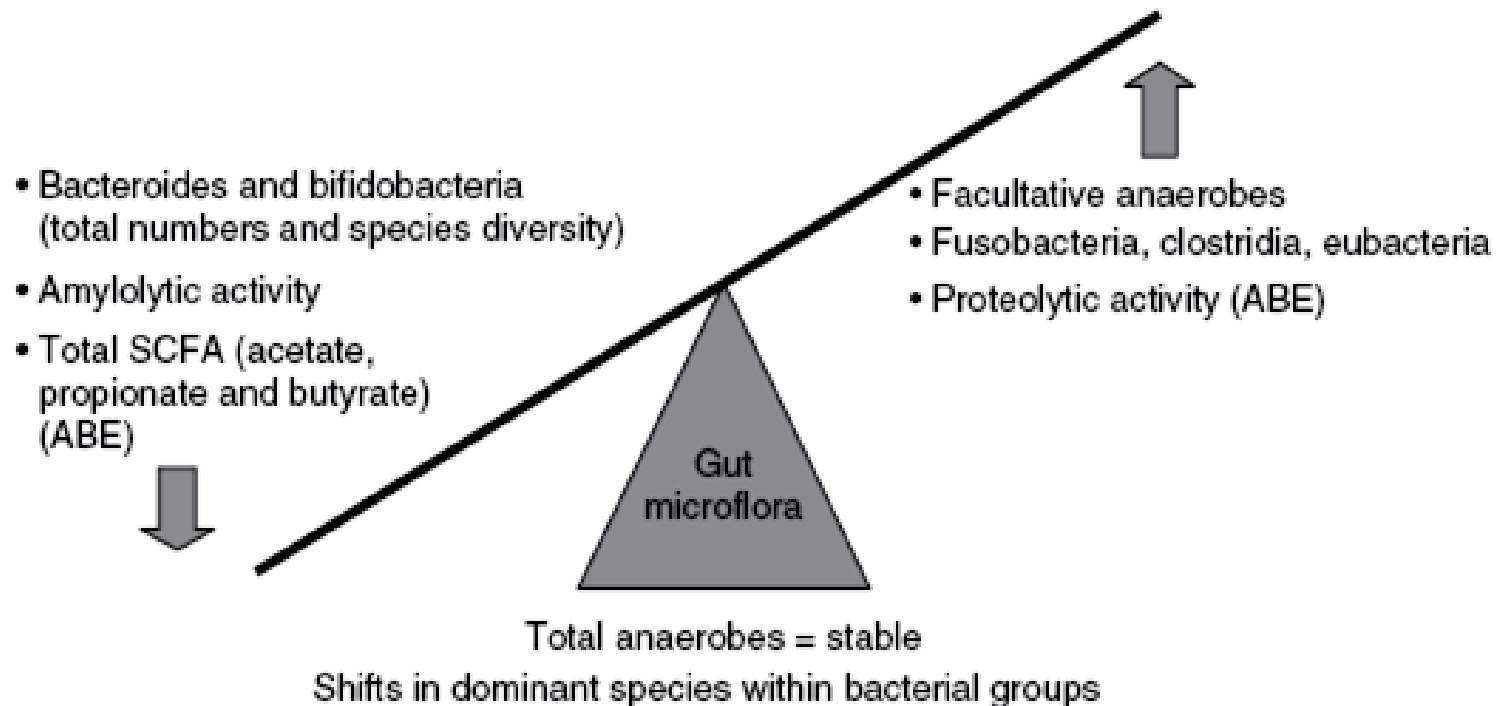


Adult Microflora

- Adult microflora is subject to change based on diet, stress, antibiotics
- A theory of aging - the increase of bad bacteria producing toxic substances in the large bowel is a factor of aging
- Proteolytic bacteria such as clostridia, which are part of the normal gut flora, produce toxic substances including phenols, indols and ammonia from the digestion of proteins.”



- Antibiotics prescribed to the elderly is particularly more problematic
- Key changes in the elderly:



Formula for Disease

- Essentially an increased numbers of facultative anaerobes (can make ATP if oxygen is present or switch to switch to anerobic if oxygen not present) , in conjunction with a decrease in beneficial organisms such as the anaerobic lactobacilli and bifidobacteria, amongst other anaerobes
- These changes, along with a general ***reduction in species diversity*** in most bacterial groups, and ***changes to diet and digestive physiology*** such as intestinal transit time, may result in increased putrefaction in the colon and a greater susceptibility to disease.

Small Intestines

- The length of the small intestines is 20 feet
- Average transit time is 2 hours
- Flow rate faster than colonization rate
- It is necessary for the bacteria to attach in order for the good bacteria to colonize
- Bacterial layer one cell thick

Large Intestines

- Length of the large intestines is about 6 feet
- Flow rate slower (18 -24 hours) than colonization rate
- Attachment is not necessary for colonisation
- Bacterial layer in mucous up to 200 cells thick

- This means it is far easier to maintain or re-establish proper levels of good bacteria in the colon than in the small intestine
- It also explains the why there is so much more bacteria in the colon than the small intestines
- This is why there is so much digestive distress, leaky gut, food allergies etc.
- This means strategies must focus on protection and nutrition for the microflora in the small intestines

Nutrients For Energy

- G.I tract mucosa is only body tissue with a systemic and luminal nutritional source
- Over 50% of nutrition of small and large intestinal mucosa is luminal

Energy Source						
	Glucose	Glutamine	Butyrate	Aspartate	Acetate	Propionate
Duodenum	30%	60%	-	10%	-	-
Jejunum	20%	70%	-	10%	-	-
Colon	5%	5%	60%	-	20%	10%

Gut Flora Is Essential For...

- The development of both Th1 and Th2 in the body and the mucosa
- The numbers and activity of macrophages
- For antibody development in the body of the mucosa and the body
- Developing of 'immune tolerance' mechanisms
- Decreasing susceptibility to infection

Good Bacteria and The Immune System

- Drives the development of the our antibody system, our cell-mediated immunity and all immune tolerance systems during the neonatal period
- ‘Enables’ the immune systems to give the correct response to food and environmental substances - and ensures our ‘tolerance’ of the normal flora primarily via T-reg cells
- Makes sure the immune system to reacts quickly and appropriately to potential pathogens

Brain Gut Connection

- Communication goes both ways
- A healthy gut sends the right signals to the brain and a healthy brain send right signals to the gut

Stress can adversely affect the gut:

- Causing changes in gastrointestinal motility and secretion
- Having a negative effect on regenerative capacity of gastrointestinal mucosa and mucosal blood flow
- Having a negative effects on intestinal microflora
- It can also inhibitive nutrient absorption and digestive enzyme output

Gut Brain

- The gut makes neurotransmitters and has a direct connection to the brain
- Probiotics and prebiotics have been shown to modify brain chemistry reducing anxiety and creating a more positive focus
- Studies show they can also help decrease cortisol levels and stimulate other neuroendocrine responses

Brain Gut

- Gut bacteria sends message to the brain and the brain sends messages to the gut
- The communication is done through the vagus nerve
- 80% of the vagus nerve fibers send information from the gut to the brain and the remaining 20% is controlling for things like maintenance of heart function, digestion and breathing
- Vagus nerve stimulation helps control disruption of the gap junctions
- And it can differentiate between good and bad bacteria

Good Bacteria

- Is anerobic and is know primarily as lactic acid bacteria (LAB)
- The two main species are the lactobacilli and the bifido bacterium
- The production of lactic acid changes the ph of the intestinal tract making it more synergistic for good bacteria and less optimal for bad bacteria and yeast
- Good bacteria can have a synergistic relationship with yeast and fungus to produce helpful enzymes
- Good bacteria are considers gram-positive and bad bacteria is considered gram-negative

In Conclusion

- Many aspects of the gut bacteria are not well understood
- It is the subject of a lot of current research and so information will be changing as researchers
- For our role as practitioners it is important that we know how the good bacteria can help out clients or how lack of it can be related to their health concerns
- More importantly, how we support the health of the good bacteria will be the key to securing better client outcomes.

