A gut feeling: pulses for health (and the planet)

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The gut microbiome is an important ‘human organ’. Thousands of species of bacteria and other microbes. Everyone’s is different.

Microbiome ‘health’ is linked to many aspects of disease

- Bowel problems: IBS, IBD
- Cancer
- Cancer drug therapeutic success
- Obesity
- Mental health.

Microbiome dysbiosis linked to low complexity of species and changed species mix.
Dietary fibre is a broad class of complex carbohydrates. Fibre influences the gut microbiome health, diversity and composition in complex ways. Dietary fibre is the main source of nutrition for our microbiome. Microbiome health may be worsened by poor food choices and availability. Highly processed foods are often low in fibre, low in fibre diversity, physically homogenous so not persistent in gut. Western diet is dominated by a few main crops and dietary fibre types.
Fibre in food: Feeding our microbiome

- **Dietary fibre** feeds a community of microbes
- Different fibre sources feed different parts of the community
- Fibre diversity leads to microbiome diversity

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Fibre in food:
Health drivers of innovation

- Current guidance emphasises eating a range of fruits, vegetables, pulses, cereals
- Driven largely by mix of calories, vitamins, fat, carbohydrate
- Fibre largely considered a single type, and need for bulking of material in the gut.

- We need to consider improving fibre diversity
  - Which foods differ substantially in fibre type?
  - Which foods have better fibre for supporting the beneficial microbiome?
Fibre in food: Pulses are an opportunity

• We aim to develop and promote legume-based foods with the most beneficial fibre contents for health

• Pulses are generally high in fibre

• Pulses have many advantages in sustainable agriculture and protein content

  • Which pulse fibres are most beneficial to the gut microbiome?
  
  • How do fibres vary between pulses (lentils/beans/peas/landraces?)
  
  • How are the fibres affected by processing during food manufacturing?
Dietary Fibre: Complex carbohydrates

- Discovering diversity in plant complex carbohydrates - pulses, plants
- Genetics of plant carbohydrate biosynthesis
- Future: engineering or strategies for breeding of novel or improved dietary fibres or digestibility of fibre
Dietary Fibre: Complex carbohydrates

- Discovering mechanisms of fibre carbohydrate breakdown by microbes
- Pathways and communities of microbes that can benefit from nutrition using specific fibres


Cockburn and Koropatkin JMB 2016
A gut feeling: local opportunities

- Building a local consortium to work on fiber and health.
  - Pulse diversity, agriculture
  - Fibre diversity
  - Microbiology of bacterial growth
  - Microbiome studies in humans/lab
  - Food choice, food availability, population health studies.

- Join us!