



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

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Fibre

Health drivers of innovation in food

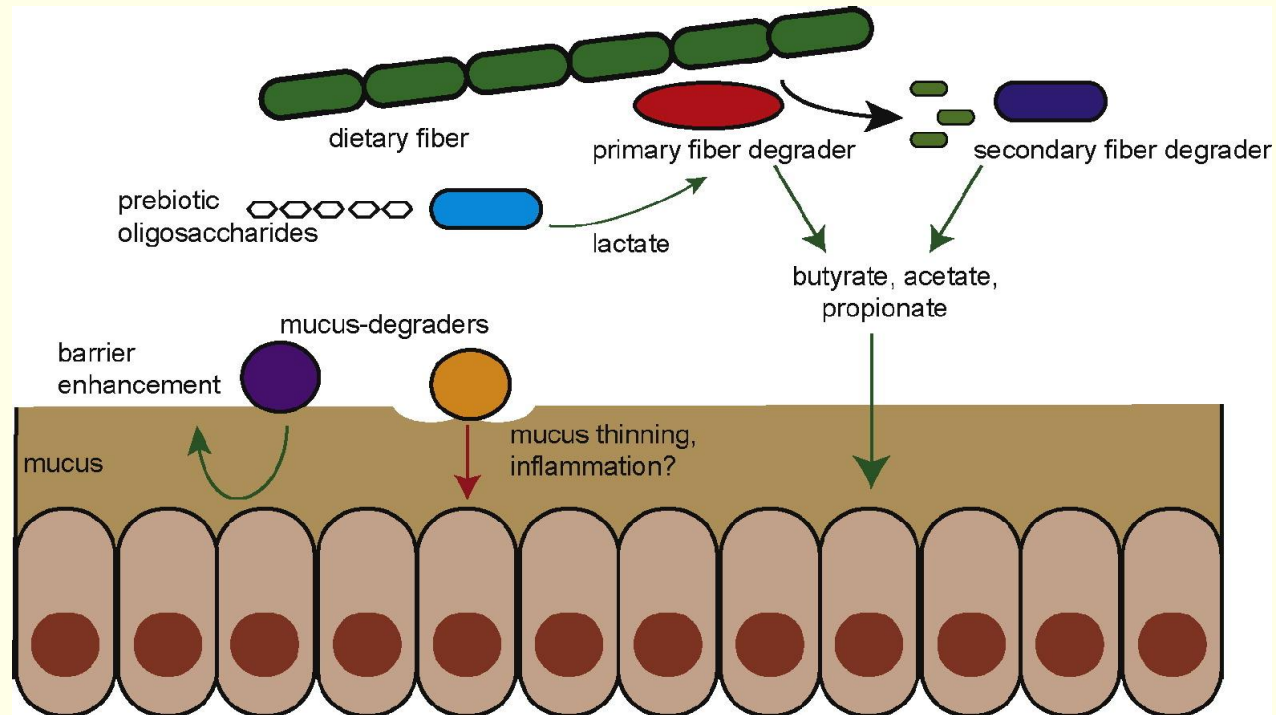
- The gut microbiome is an important ‘human organ’. Thousands of species of bacteria and other microbes. Everyone’s is different.
- Microbiome ‘health’ is linked to many aspects of disease
 - Bowel problems: IBS, IBD
 - Cancer
 - Cancer drug therapeutic success
 - Obesity
 - Mental health.
- Microbiome dysbiosis linked to low complexity of species and changed species mix

Fibre

Health drivers of innovation in food

- **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



Cockburn and Koropatkin JMB 2016

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

Fibre in food: Health drivers of innovation

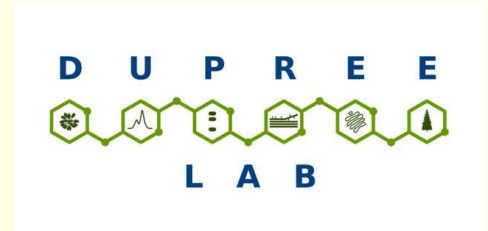
- Current guidance emphasises eating a range of fruits, vegetables, pulses, cereals
- Driven largely by mix of calories, vitamins, fat, carbohydrate
- Fibre largely considered a single type, and need for bulking of material in the gut.



- **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



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- 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

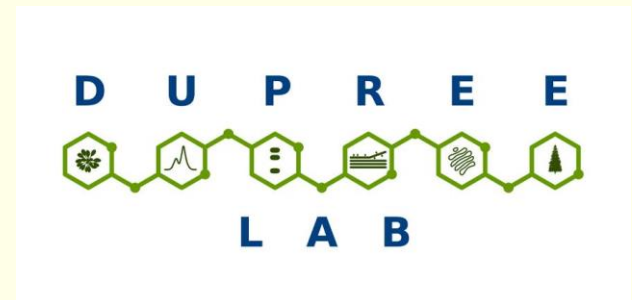
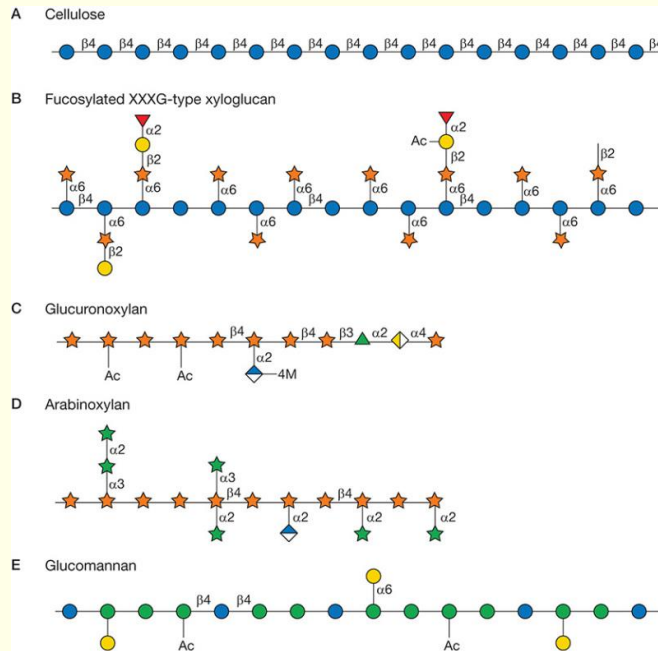
- Discovering diversity in plant complex carbohydrates- pulses, plants
- Genetics of plant carbohydrate biosynthesis
- Future: engineering or strategies for breeding of novel or improved dietary fibres or digestibility of fibre



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credit Wikipedia

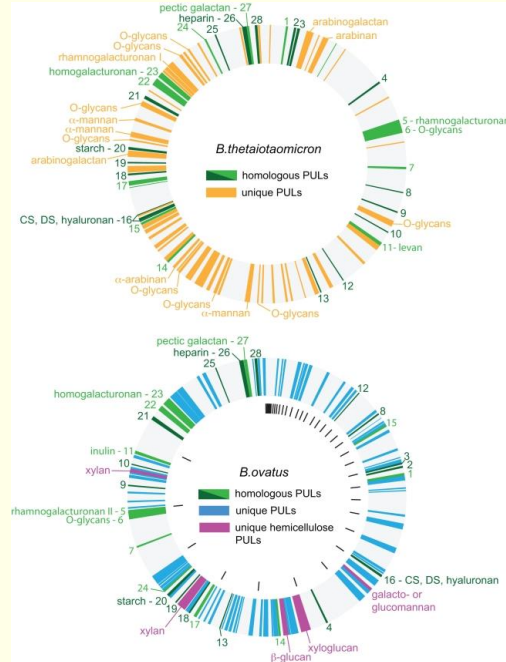


Dietary Fibre: Complex carbohydrates

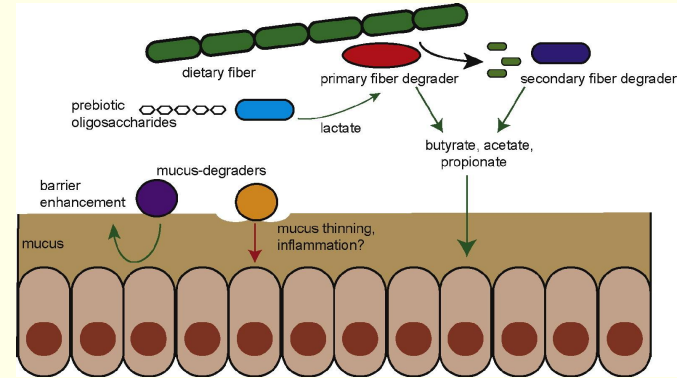
- Discovering mechanisms of fibre carbohydrate breakdown by microbes
- Pathways and communities of microbes that can benefit from nutrition using specific fibres



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Martens et al. PLoS Biol. 2011 Dec; 9(12): e1001221



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!



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