

choosing ~ eating ~ Living



A Vital Link in the Food Chain

We undertake international quality research relevant to food and human health. Working in partnership with others we provide underpinning science for consumers, policy makers, the food industry and academia.

The gut is central to issues of food, diet, nutrition and health, and we will expect to understand the interactions that go on there. Our research spans the whole food cycle; from food production and food choice to digestion and the role of food components in long-term health.

Our research is about:

Choosing - providing safe, nutritious food that we want to eat
Eating - understanding gut function and malfunction
Living – food components beyond the gut wall

Our objectives are:

- **Biology of the Gastrointestinal Tract** – How the gut responds to what we eat, how it functions and malfunctions
- **Nutrition, Diet and Health** – Understanding how our diet influences our long-term health. Cell, organ and whole body response to what we eat.
- **Food Safety** - How foodborne pathogens interact with the body and their elimination from the food chain
- **Food Innovation** – Maintaining food quality with a healthy diet. Meeting consumer need without affecting acceptability or compromising safety
- **Integrating tools and technologies** – To support the science and interpret the data and apply it in human health and wellbeing.

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Providing safe, nutritious food that we want to eat

Controlling pathogens in the food chain

IFR's research into food borne disease concentrates on *Salmonella*, *Campylobacter* and *Clostridium botulinum*. Our deeper understanding of the fundamental biology and the behaviour of pathogens within foods, allows our scientists to aid development of novel control strategies. For example, improved mathematical models are leading to better identification of critical control points in food production systems.

Food innovation - designing safety and health-supporting characteristics into foods

Understanding the rules that determine the assembly of food structures and their subsequent disassembly in the GI tract is empowering new approaches to the design of foods that are safe and healthy as well as appetising.

Understanding how we choose the foods we eat

IFR's social scientists are researching our complex responses to food safety and healthy eating information, informing policy development.

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Understanding gut function and malfunction

How the gut responds to what we eat

Understanding the normal gut microflora will lead to the development of improved probiotics. Knowing the controlling factors for cell proliferation in the gut wall will help us understand the development of GI tract cancers. By studying the gut immune system we can understand and control the triggers for allergic reactions to food, and may develop novel delivery methods for oral drugs and vaccines.

How food borne pathogens interact with the human body

Understanding how *Salmonella* and *Campylobacter* survive and grow in the GI tract and inside host cells can open new routes to the prevention and treatment of food borne disease – for example, identifying new targets for antimicrobial drugs and vaccines.

IFR has developed model gut systems to simulate digestion in the stomach, small intestine and colon. These will provide a greater understanding of how the GI tract interacts with food structures to deliver macro- and micro-nutrients, and help us to deliver our vision for health promotion via the diet.

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Food components beyond the gut wall

"Let food be your medicine" Hippocrates 400BC

Understanding how our diet influences our long term health

Phytochemicals have potential as health-promoting components of our diet. The focus of research at IFR is on flavonoids, folates and glucosinolates and their potential to reduce the risk of cardiovascular disease (CVD) and cancer in healthy individuals and high risk groups. The provision of dietary advice to policy makers and the development of foods with enhanced levels of protective phytochemicals provide practical applications of the research.

IFR studies the relationship between micronutrient intake and optimal health, including research on iron and selenium, reflecting UK public health concerns. A combination of cell/molecular biology and human studies are used to study bioavailability, bioactivity, and reasons for individual variability, and biomarkers of exposure, status and risk of chronic disease are being developed using –omics approaches.