**Nutrition and obesity research**

The aim of this research area is to support a broad range of high quality research relating to diet, nutrition and obesity that will help in the promotion of health and in the protection from, and treatment of, disease such as diabetes and cardiovascular problems.

The Medical Research Council (MRC) currently funds a broad range of high quality research relating to diet, nutrition and obesity.

Our portfolio demonstrates strengths in nutrition, dietary and metabolic research relating to molecular and clinical aspects, in the pathways and causes of disease, and the mechanisms at different periods of the life course.

It also includes:

* research at population level, building on MRC’s longstanding cohort investments
* epidemiologic approaches, including biological, social and psychological determinants
* observational and interventional research on behaviours leading to chronic diseases.

### MRC priorities for nutritional research

Nutrition, diet and physical activity play an important, if not a determinant, role in the promotion of health and in the protection from and treatment of disease. Poor nutrition is a direct cause of disease such as diabetes and cardiovascular problems and we are facing a global obesity epidemic.

The challenges are worldwide and will require a global, coordinated response. The UK has earned a strong reputation in nutrition research but we now need to ensure we are well placed to take on these new challenges.

In response to this, the Office for Strategic Coordination of Health Research asked MRC, in partnership with the National Institute for Health Research (NIHR), to conduct a [strategic review of nutrition and human health research](https://www.ukri.org/publications/mrc-neuroscience-of-obesity-workshop-gut-and-brain-communication/). The review assessed the critical gaps in basic, translational and applied health research on the underpinning role of nutrition in individual and public health.

The review panel’s report, published 2017, praises the excellent nutrition research in the UK and highlights existing strengths but warns that the UK is facing a potential crisis in fundamental nutrition research as fewer young investigators enter the field and experienced researchers approach retirement. There is continuing strength in the behavioural and social science aspect of nutrition research but basic mechanistic understanding of nutrition research and its translation to healthier food is beginning to fall behind.

The review sets out a vision for the field’s future that is broad and ambitious. It envisages revitalisation, capitalising on the immense potential, expertise and resources (both public and private) in the UK, maximising the translation of research to improve human health and wellbeing, both nationally and globally.

In response to the review and after broad discussion, MRC identified three pillars of activity for nutrition research for immediate action to give long term gain.

#### Building the UK research base: the UK nutrition and human health research partnership

The review articulates the need for clear and visible leadership from the scientific community and from the funders to deliver nutrition research. To achieve this, MRC, in partnership with the National Institute for Health Research, established a UK human nutrition research partnership comprising experts from academia, health research (at individual and population level) and industry to develop and realise an implementation plan for the review recommendations. We will work closely with colleagues in the Biotechnology and Biological Sciences Research Council (BBSRC) to continue our collective approach.

Under the auspices of MRC, the partnership was tasked with identifying research opportunities, establishing pilot projects and promoting capacity building. The focus will be on some of the tougher scientific challenges such as:

* linking cohorts to interventional nutritional research
* linking nutritional epidemiology to mechanistic understanding
* how we can start to tackle these.

The partnership will also look at longer-term solutions to address fundamental problems such as standardising measures. To have real impact, it must feed into decision-making bodies, link to the devolved health administrations, policy units, industry and the public.

#### Developing plans for global nutrition research

Global nutrition for health research has the potential to transform health and wellbeing across the world. Nutrition, and its influence at all life stages, plays a pivotal role in diseases that are non communicable in lower and middle income countries. It also has an impact on response and resilience to infectious diseases.

Working across the research councils, the Foreign Commonwealth and Development Office and the Department of Health and Social Care, through the Global Challenges Research Fund, we are launching new funding opportunities to tackle some of these global challenges and aiming to create investments in the long term in global nutrition and health research.

#### Working with stakeholders

The Office for Strategic Coordination of Health Research review highlighted that to truly understand the nutrition ecosystem we must work with a variety of stakeholders including the food industry, agricultural, retail, food production and packaging.

Industry must be seen as part of the solution and partnership with the food and nutrition science industry is vital so that research can lead to healthier products and improved nutritional support. This partnership must be governed by clear principles for engagement and MRC has worked with key stakeholders to build on its existing guidance in this area and to develop a framework for engagement between researchers and industry.

The establishment of strong, pre-competitive research collaborations with the food and nutrition science industry could be an opportunity to build capacity in the field and to enhance the sharing of expertise and resources.

### Mechanistic research in nutrition

Changing diets and dietary habits are placing an unsustainable burden on healthcare systems, individuals and societies. Poor or inappropriate nutrition is associated with increased risk of many chronic conditions, making the widespread tendency towards consumption of foods with high energy and low nutrient density a pressing challenge for the developed and, increasingly, the developing world.

Despite the clear influence of diet on health, many of the fundamental mechanisms which link nutritional intake to physiological consequences remain undetermined. An improved mechanistic understanding will form part of a wider robust evidence base, which is important in determining cause and effect relationships and the development of healthier foods, optimisation of nutritional guidelines and determination of effective intervention strategies.

There is, therefore, a need to answer fundamental questions about the mechanisms by which dietary components impact on biological processes and how these link through to influences on health and disease.

MRC encourages research that will increase mechanistic understanding of the role that foods and nutrients play in health and disease.

Researchers from a range of backgrounds are invited to apply their expertise to understand how diet and nutritional components act at a molecular, cellular and systems level to influence physiological and pathological processes. Proposals should contribute to one or more of the following goals:

* robustly ascribe cause and effect from epidemiological correlations and nutritional interventions
* increase understanding of variations in nutritional requirements (at key life stages in different population groups) and in response to dietary interventions
* provide a robust mechanistic understanding to inform nutritional interventions.

We are particularly keen to attract the most innovative, exciting and collaborative applications, including partnerships between clinical and basic scientists and with industry.

### Working in partnership

The highly multidisciplinary nature of nutrition research presents particular challenges spanning the interests of a number of funders. We have set out below how we are working in partnership to unite relevant disciplines with the aim of addressing key areas in the field.

### A vision for food, nutrition and health research across councils

MRC, BBSRC and ESRC recognise that a clear strategy with closer joint working across councils is needed to further support integrative research within food, nutrition and health. For example, where research problems are influenced by a variety of interacting biological, medical and social factors, approaches which consider these interdependencies will provide a more effective basis for new health policies, therapies, products and interventions.

By encouraging a collective approach to address important multidisciplinary research questions the aim is to underpin reliable nutritional advice, provide better understanding of food choice and consumer behaviour, improve public health messaging and support innovation to develop healthier food products.

This joint strategic approach, running alongside specific council activities, highlights emerging opportunities for integrative research across council remits which we can then take forward in partnership with other funders and stakeholders.

### European partnerships

We collaborate with existing European and international research efforts to promote the sharing of resources and expertise where a transnational approach will add value.

#### Joint programme initiative: a healthy diet for a healthy life

The Joint Programming Initiative – A Healthy Diet for a Healthy Life (JPI HDHL) operates on an ‘a la carte’ basis. As part of its various activities, MRC and BBSRC have joined forces to support multidisciplinary transnational research consortia involving UK partners on the intestinal microbiome research and nutrition and the epigenome funding opportunities.

MRC was also a partner in the JPI HDHL transnational funding opportunity for research proposals on nutrition and cognitive function. MRC funding supports three of the successful research consortia.

MRC and BBSRC were involved in a JPI HDHL funding opportunity on the development of targeted nutrition for the prevention of undernutrition in older adults, which supported six consortia proposals involving UK teams.

In 2021, MRC, BBSRC and the Food Standards Agency joined forces to support UK researchers in two transnational consortia in a funding opportunity titled addressing adverse and beneficial effects of food ingredients and food processing on hypersensitivities to food.

[Find out more about the Joint Programming Initiative – A Healthy Diet for a Healthy Life (JPI HDHL) on their website.](https://www.healthydietforhealthylife.eu/index.php)

### Partnership with the food industry

In recognition of the need to strengthen our engagement with the food industry, MRC has been an active partner in three initiatives:

* Diet and Health Research Industry Club
* Innovate UK’s Nutrition for Life
* Priming Food Partnerships.

These initiatives have facilitated high quality innovative research into diet and health within UK universities and research institutes, aimed at providing high quality research that could underpin the development of products that deliver enhanced health benefits for consumers.

The Diet and Health Research Industry Club and Nutrition for Life form part of a research pipeline which provides an opportunity for projects led by industry to be developed based on outputs from earlier phase pre-competitive research.

Understanding and influencing behaviour, particularly in a marketing and retail context, will play a key role in encouraging individuals and target populations to move towards healthy food choices.

#### MRC neuroscience of obesity workshop: gut to brain communication

Obesity and its related diseases place a significant burden on healthcare systems, and tackling obesity is a government-wide priority. In 2010 MRC produced a set of [priorities for its investment in obesity research](https://www.ukri.org/our-work/browse-our-areas-of-investment-and-support/obesity-research/).

Three specific areas were highlighted in the priorities:

* from metabolism to disease – the mechanistic links between obesity and disease
* neuroscience of obesity
* prevention and intervention.

The area of neuroscience of obesity is relevant to MRC’s Population and Systems Medicine Board (PSMB) and Neuroscience and Mental Health Board (NMHB). Central to this area is the opportunity to use the strengths within the UK’s neuroscience research community to gain a better understanding of the neuroscience of obesity, which remains an important but relatively neglected area.

A [workshop on the neuroscience of obesity: gut to brain communication](https://www.ukri.org/publications/mrc-neuroscience-of-obesity-workshop-gut-and-brain-communication/) was held in October 2014, hosted by MRC’s Metabolic Diseases Unit and supported by both PSMB and NMHB. It drew together experts from across the spectrum of research. The aim was to consider how the field had evolved since MRC developed its obesity priorities in 2010 and identify priority topics through which MRC could make an impact.

In response to the key research opportunities highlighted in the report, PSMB and NMHB encourage new cross-disciplinary research and programme grant proposals which could be jointly funded between PSMB and NMHB.

Successful applications will be supported through the [types of funding we offer](https://www.ukri.org/councils/mrc/guidance-for-applicants/types-of-funding-we-offer/) and will be assessed in partnership with other research boards, as needed.

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We welcome proposals which aim to improve understanding, at cellular, systems and whole body levels (in humans or model systems where appropriate), of the physiological and pathological processes by which dietary patterns and food constituents influence health outcomes. High-quality, small-scale studies in well-defined healthy, at risk, or clinical groups are particularly encouraged.

Projects should unite nutrition research with leading-edge biology and physiology to deliver new understanding of the role that foods and nutrients play in physiological and pathophysiological systems. Experimental medicine approaches, and human studies which provide opportunities for reverse translation to more basic research, are also within scope.

Topics of interest include but are not limited to:

* the role of dietary components in gut health and the development of disease
* gut to brain communication in relation to appetite control, satiety and reward.