Institution: University of East Anglia

Unit of Assessment: 6 - Agriculture, Veterinary and Food Science

a. Overview

Nutrition research within the Norwich Medical School, UEA was established in 2004. In the interim period it has grown substantially. Since 2008 we have published 25 papers in the top rated journal in nutrition research (American Journal of Clinical Nutrition), and gained research awards of over £14.5M including recent funding from US and UK Government and US industry. In RAE2008, the 5 nutrition academics then in post contributed to UEA submissions to the Biological Sciences and Epidemiology and Public Health units of assessments. The growth in the Nutrition group since then has culminated in its establishment as one of 4 research Departments within the Norwich Medical School and allows a standalone submission to UOA 6 for REF 2014 which comprises all of our academic staff. Alongside this submission, the Norwich Medical School is also submitting 39 staff, primarily to UOAs 1 and 2. In addition to the 11 Category A researchers submitted to UOA 6, Nutrition is home to 11 research associates and 18 post-graduate research students (July 2013).

Since RAE 2008, preventive medicine has become a core component of the Norwich Medical School strategy and Nutrition research has gained substantially by being part of a medical school: it allows us to conduct research in healthy volunteers and varied patient groups, to make use of clinical expertise for our trial designs, and to access clinical support and state of the art clinical equipment. Our research falls within 4 key areas:

- Plant bioactives and cardiovascular health, with a focus on specific flavonoid sub-classes
- Dietary fat composition, cardio-metabolic, cognitive and muscle health
- Micronutrient metabolism, status and related diseases
- Nutrigenetics

We employ a translational approach, integrating plant and food sciences, animal and cell models, nutritional epidemiology (Harvard cohorts, EU and national population based studies), and human intervention trials in healthy participants and patient groups. We also benefit from being a core part of the Norwich Research Park (NRP), which includes 3 BBSRC-funded research institutes (the Institute of Food Research, the John Innes Centre and the Genome Analysis Centre), and the Norfolk & Norwich University Hospital. Within the NRP we lead the Food & Health Alliance (Nutrition) (FAHA), one of two NRP priority research strands and one of the largest EU Centres focused on research in *Food, Health and the Environment.*

b. Research strategy

Our overarching strategic goal is to take full advantage of the unique environment and strengths of the medical school within the NRP, along with our established international collaborations, to inform and refine the current knowledge base of the impact of diet on optimal health and risk of chronic disease. To achieve this goal we have:

- Established a research focus on key public health issues (exemplified by our research in cardiovascular health and healthy ageing) and future priority areas in nutrition research including nutrigenetics, cognitive health and the role of the gut microbiome in flavonoid metabolism.
- Focussed our research strengths in dietary fats and bioactive dietary components with a view to inform and refine the current five-a-day message, and dietary fat recommendations.
- Adopted a translational approach (through wide collaborations and strategic recruitment) integrating molecular biology through to epidemiology and randomised controlled trials.
- Established collaborations with world-leaders as a cornerstone of our multi-disciplinary approach, exemplified by our successful research programme with Harvard University.
- Led the nutrition component of the BBSRC Institute of Food Research / UEA institutional programme grant (2012 – 2017) with £2.2 million BBSRC funding to our department.

University support to further build the Nutrition department is exemplified by:

- The recent establishment of a UK Clinical Research Collaboration (CRC) registered clinical trials unit (CTU) with full statistical and health economic support and installation of a 3T

Magnetic Resonance Scanner.
- Reorganisation of the management structure of Norwich Medical School to promote research.
- The provision of additional Nutrition laboratory facilities as part of a new medical research building (£19m) which is currently under construction adjacent to the hospital.
- The recent appointment (Oct 2013) of an International leader in nutrigenomics - Prof Michael Muller (University of Wageningen) as NRP Food & Health Alliance Director.

Norwich Medical School organisation and structure: A vibrant and sustainable programme of translational research relationships across the university and NRP has been enhanced during the REF period, including appropriate management structures to drive the research strategy forward. In 2011, the newly appointed Head of School consolidated the Norwich Medical School into 4 research active departments (including the Dept of Nutrition) and integrated the Norwich Medical School's research focus with existing scientific excellence on the NRP. This has resulted in the Norwich Medical School concentrating primarily in the areas of Nutrition, Gastroenterology, Medical Microbiology and Musculoskeletal Disease, while continuing to build Public Health and Health Services research. The School sits within the Faculty of Medicine and Health Sciences.

Research strategy and NRP: The close proximity of our NRP partners facilitates close working relationships and cross-fertilisation of research ideas. IFR is extensively integrated with the Norwich Medical School and their current institutional programme grant (2012-2017), renewed following quinquennial peer review, has 5 of its PIs from the Norwich Medical School including Cassidy and Minihane who are driving the programme's human nutrition research. The NRP has been recognised as having important capability to contribute to the Government's growth agenda, particularly the biomedical economy, through a £26 million investment announced in March 2011. This is providing funding for a range of scientific infrastructure projects, including a large bio-repository facility situated within the new Norwich Medical School research building. Prof Michael Muller, NRP Food & Health Alliance Director, will further build and consolidate existing areas of strength in nutrition research in collaboration with our NRP partners and internationally.

Nutrition Department research strategy: In an era where preventive medicine is becoming increasingly important from both a social and economic perspective, the Norwich Medical School has invested extensively in nutrition research as an area of strategic importance. In line with the Government's shift in focus towards prevention, and reduction in health care costs, our strategic goals are to identify what constitutes a healthy diet for different individuals (personalised nutrition) and to elucidate mechanisms of action of key bioactives, thus contributing towards the development of appropriate dietary recommendations and guidelines, as well as helping the food industry produce healthier products.

On-going interdisciplinary research covers all major aspects of the translational pathway, including mechanistic studies in animal and cell models, human studies investigating bioavailability, clinical trials and population based cohort studies, in key public health areas including cardiovascular, bone and cognitive health. We generate hypotheses from nutritional epidemiology data and systematic reviews in collaboration with the best characterised cohorts worldwide, including the Harvard-based *Nurses' Health Study* & *The Health Professionals Follow-up Study, Framingham, EU Prospective Investigation on Diet and Cancer (EPIC)*, the UK Twins Registry (*TwinsUK)*. These data inform and prioritise our intervention trials which are at the core of our research. Our interdisciplinary research strategy investigates the impact of key dietary components on major age-related chronic diseases, in particular cardiovascular and metabolic health, and can be broadly divided into 4 research themes:

(i) Flavonoids and other plant bioactives

A unique aspect of our research in plant bioactives is the integrated approach applied to investigate their impact on human health. This includes studying their absorption, metabolism, impact on risk biomarkers and incident disease, and investigation of their physiological and molecular mechanisms of action. The ultimate aim is to develop the knowledge base to refine advice on consumption of specific fruits and vegetables that will promote healthy ageing, and to inform and influence the development of new plant-based functional ingredients and products for healthy ageing.

Research achievements: We have aligned our research programme with the world-leading nutrition

epidemiology group based at the Harvard School of Public Health, providing specialised expertise in flavonoids that was not present at Harvard. This successful, established collaboration has been shortlisted for the Times Higher Education 2013 Award of 'International Collaboration of the Year'. Our work has highlighted the importance of different flavonoids in disease risk reduction. Specifically we have shown that one class of flavonoids, anthocyanins, reduce the risk of myocardial infarction, type 2 diabetes and Parkinson's Disease. Our complementary programme of randomised controlled trials (RCTs) has confirmed these findings and demonstrated that the disease risk reduction is likely to be in part attributed to improved insulin sensitivity and vascular function. Using novel, state-of-the-art, stable isotope approaches we have also provided a unique insight into flavonoid absorption and metabolism, and identified novel metabolites that are now being investigated for bioactivity.

On-going and future research plans: Our planned research with well characterised prospective cohort studies, in combination with human intervention trials at UEA, will help us further understand flavonoid absorption and metabolism, identify biomarkers of anthocyanin intake, and investigate dose-response relationships of the effects of flavonoids on cardio-metabolic health and cognitive function. This will be achieved through recently secured awards; these include £2.2M from BBSRC to identify genotypic and physiological determinants (age, gender, microbiota speciation) of flavonoid absorption and metabolism and to further understand the relative importance of different flavonoid sub-classes in cardio-metabolic health, and $1.1 million from the US Dept of Agriculture to conduct a dose-response anthocyanin trial at UEA on vascular health and insulin resistance (Minihane, Cassidy, Kay, Curtis, Rimm (Harvard)).

(ii) Dietary fats

We use human RCT and epidemiological approaches, with supporting mechanistic work in cell/animal models, to investigate the relationship between dietary fat intake and health, including cardiovascular health and sarcopenia. Our overall aim is to advance the knowledge base needed to refine current dietary fat recommendations. We have enhanced the current understanding of dose-response relationships between dietary long chain omega-3 fatty acid intakes (EPA and DHA) and vascular function, inflammation and plasma lipid profile in both the fasting and non-fasting state. Given the impact of *APOE* genotype (see below), cardio-metabolic health and omega-3 status on dementia risk, and the projected 3-fold rise in dementia incidence by 2050, we have also sought to integrate cognitive function (and its decline) into our research programme; some initial funding (Abbott $2.2 million) will ensure this will be a significant focus of our strategy.

Research achievements: Our FSA funded trials (4 UK centres, Minihane PI) demonstrated for the first time that dietary achievable EPA+DHA intakes (0.7 and 1.8 g/d) significantly modulated lipid profile, with a greater effect in men, and specifically in those with an *APOE4* genotype (see section iv). Through a series of BBSRC and Wellcome funded grants we showed that it is DHA rather than EPA in fish oils which increases LDL-cholesterol, and through associated *ex vivo* cell culture work showed that the underlying mechanism related to differences in hepatic uptake of lipoproteins. This work has significantly advanced knowledge of 'what dose of EPA+DHA does what, and in whom'; these are key questions when defining policy and refining population dietary recommendations. In sarcopenia research, the impact of fat intake was largely unknown; we showed that both total fat intake and fatty acid composition were associated with skeletal muscle mass and metabolism.

On-going and future research plans: Our strategic plan includes translational projects in the following areas: (1) EPA and DHA in cognitive health and muscle strength; (2) combined effects of fatty acids and flavonoids on vascular function, insulin resistance, hepatic steatosis and cognitive health; (3) genetic variants influencing responsiveness to fat; (4) omega-3 fatty acid sustainability. For initiative 1 and 2 we are leading a large multi-centre international (UK, USA, Australia) 1-year RCT funded by Abbott Nutrition, $2.2 million, (Flavomega, 2013-2016) investigating the combined impact of fish oils and select flavonoids on cognition function in individuals with mild cognitive impairment. Taking a non-reductionist approach, and investigating the combined impact of complementary dietary components (based on knowledge of their physiological targets) on major health end-points (cognition, hepatic steatosis) is a current and likely future major focus over the next 5 years. For initiative 4, as part of our BBSRC Programme Grant (2012-2017, £2.2 million) we are examining the absorption and bio-efficacy of EPA+DHA from *Camelina Oil* developed using plant GM techniques in animal models, with future planned experiments in humans. Through RCTs

we plan to confirm our epidemiological findings on the important role of dietary fat and muscle fatty acid composition in the development of sarcopenia, employing state of the art imaging techniques to unravel the underlying mechanisms.

(iii) Micronutrient metabolism, status and related diseases

Our research strategy focuses on the bioavailability of, and biofortification with, micronutrients including iron, selenium, calcium and vitamin D. Our data will underpin the development of dietary recommendations (DRVs) for optimal health, replacing the traditional focus on 'essentiality' and the prevention of deficiency diseases. In addition to examining these micronutrients in isolation, our ongoing multi-centre RCT (eg NU-AGE EU FP7) employs a whole diet approach to examine the impact of combined foods/micronutrients on healthy ageing.

Research achievements: Through carefully designed RCTs and systematic reviews, we have provided insight into dose-response relationships between selected micronutrients and health (funded by the EU, EURRECA Network of Excellence). A particular highlight was defining the relationship between selenium intake, status and prostate cancer risk; these data suggested that current recommendations are lower than optimal, and are being used by the European Food Safety Agency to derive new DRVs. In collaboration with *TwinsUK* we quantified the genetic basis for inter-individual variations in iron status, work that will contribute to understanding and optimising management of iron deficiency.

On-going and future research plans: A key focus of our current work is the impact of diet on healthy ageing, exemplified by our NU-AGE project. We are a key partner in this large multi-centre EU dietary intervention study in 1,250 older (65-80 y) people (EU-FP7, NU-AGE, €9m project, 29 partners from 16 EU countries); the focus is on the effect of dietary intervention (personalised on the basis of US healthy eating pyramid guidelines adapted for ageing populations) on inflammation, cognitive function, body composition, and bone and vascular health. In the elderly we are also investigating ways of identifying early stage dehydration (NIHR £2.2million) and are integrating this project with NU-AGE to further understand dehydration. We are working with NIH (USA) on 'Biomarkers of Nutrition for Development' project (BOND) to rank order biomarkers of iron status. We are part of a team studying iron, zinc and selenium deficiencies in Malawi to evaluate the benefits of biofortification (plant breeding/soil fertilisation).

(iv) Nutrigenetics

A particular, recent research interest (since the appointment of Minihane, 2010) is establishing the effect of common gene variants on risk of disease and response to dietary change. This matches the move towards the provision of stratified dietary advice based on an individual's genotype, particularly in 'at-risk' subgroups.

Research achievements: We have significantly advanced understanding of the association between the at-risk *APOE4* genotype (25% of the population), cardio-metabolic and dementia risk, and the influence of altered dietary fat composition. Specifically, with our long-term German collaborators (University of Kiel) we showed that *APOE4* carriers have higher fasting and post-prandial blood lipids, a pro-inflammatory, pro-oxidative status, and that they show greater response to dietary fat manipulation, particularly in males.

On-going and future research plans: A main aim of our large multi-centre trial (Flavomega, Abbott) in diet and cognition will be to establish the impact of *APOE4* genotype on cognitive decline and the response to intervention (given the large impact of this gene variant on dementia risk). In addition, we have recently started to harness genetic (GWAS), epigenetic, microbiota and metabolomic datasets (*Harvard* and *TwinsUK* cohorts) to examine associations between flavonoids, fatty acids and the genetic predisposition to risk factors for CVD, dementia and diabetes. These powerful datasets (>100,000 participants) will be used to inform our future dietary intervention trials. Our current BBSRC funded work centres on an RCT investigating the impact of age, sex, microflora speciation and genotype (assessed through targeted gene tagging and exon sequencing) on flavonoid bioavailability. This is arguably the most comprehensive investigation on-going world-wide to investigate determinants of flavonoid metabolism.

Responsiveness to priorities & initiatives: Given the growing recognition of the importance of nutrition to health, our research strategy will continue to address major public health issues with the ultimate aim of improving health and promoting healthy ageing. Our focus on dietary fats and

flavonoids as key dietary constituents of importance in both primary and secondary prevention, responds to national and international research priorities of government and EU research agencies including MRC, BBSRC, NIHR, EU, US agencies and the global food industry.

c. People, including:

i. Staffing strategy and staff development

There are 40 researchers (including post-doctoral scientists and 18 PhD students) in our Department working on flavonoids, nutrigenetics, fatty acids and micronutrients. The multi-disciplinary skills of our team (including molecular and cell biology, analytical biochemistry, clinical trials and epidemiology) allows us to conduct research across the translational pathway from fundamental mechanistic studies, bioavailability and bioefficacy studies in humans and animal models, to large cohort studies. Our 4 professors provide leadership in our key research areas: Cassidy (flavonoids), Minihane (fatty acids, nutrigenetics), Fairweather-Tait (micronutrients), and Macgregor (clinical medicine, nutrigenetics).

The recent appointment of a Chair in medical physics will ensure we can progress research with our recently installed MRI scanner to provide clinically relevant endpoints from trials. In addition, a planned professorial appointment in psychiatry/dementia will ensure we can further build our research programme in diet and cognition. We will also appoint two readers with expertise in state-of-the-art vascular measures, cognitive function assessment (brain imaging, sensitive cognitive assessment tools) and endocrinology. It is anticipated that one of these appointments will be a clinical academic, funded as part of a joint strategic partnership with NNUH. Succession planning is in place for Fairweather-Tait, who will retire imminently, with plans to recruit a professor with world-leading expertise in molecular/cell biology applied to nutrition research.

Evidence of support for equality and diversity: UEA's Single Equality Action Plan sets out equality and diversity policies. These are implemented proactively by the Equality and Diversity Committee. Information on relevant characteristics of staff and student populations is provided by an Equality and Diversity Officer and helps to ensure that equality and diversity considerations are taken into account in decision making. The University has achieved Athena Swan Bronze status. The Norwich Medical School is pursuing Athena Swan silver status (Minihane, chair school Athena Swan committee). Of the 11 submitted researchers, 6 are female including 3 of our 4 professors. There is wide cultural diversity in the Department, and our current team represent 18 countries; two thirds of the post-doctoral staff are female, along with 11 (out of 18) postgraduate students.

Implementation of the Concordat to support career development of researchers: To support researcher career development, UEA has established a Research Staff Working Group, chaired by the PVC for research, that oversees implementation of the Concordat. In Nutrition, Curtis, is the local point of contact. All our academic staff play a role in the mentoring and career development of research staff including CV building, networking and interview skills training. In September 2012 UEA was awarded the HR Excellence in Research Award from the EU Commission.

Arrangements for the effective development and support of research: All academic researchers complete an Annual Research Plan, which is discussed with the Head and Deputy Head of School. This is in addition to an annual appraisal where staff identify bottlenecks for research. Although each faculty member gets modest financial support annually from the School, they are expected to secure external research funding. In order to help with this, internal grant review panels have been set up for all Research Councils and seminars on effective grant writing are organised by the Centre for Staff and Educational Development. The research culture of the nutrition department is further enhanced by our regular sessions on grant preparation, by our support for travel to attend conferences and by the vibrant research seminars from internal and invited external speakers that take place at our monthly Department meetings and elsewhere on NRP. Following completion of probation, all research staff are entitled to apply for study leave to build their research portfolio and foster international collaborations.

ii. Research students

UEA has a thriving community of postgraduate research (PGR) students who are integrated into our research programmes. PGR student recruitment is co-ordinated and managed by the Faculty Graduate school who commission educational credit bearing research and transferrable skills

training modules. There is a Faculty seminar programme and an annual PGR conference. Our current cohort of 18 PGR students come from across the globe including Syria, Switzerland and are funded by a variety of sources including BBSRC and BBSRC-CASE awards from GSK, Unilever. At our monthly department meetings we discuss scientific ideas and research progress, with a programme of presentations of ongoing work and journal clubs covering literature from across the translational pathway. The multi-disciplinary nature of our research allows the students to understand all aspects of nutrition from molecular nutrition, trials and epidemiology, to functional food development and health claims.

d. Income, infrastructure and facilities

Income: Over the past five years the Nutrition department has received £14.5M in peer reviewed research awards from an extensive range of funders including: research councils (BBSRC £4.7M, MRC £146K, ESRC £79K); UK charities (including Diabetes UK £222K, Cancer Prevention Research Trust £127K, Action Arthritis £835K, Arthritis Research £303K); European Commission (FP6 £650K, FP7 £672K), European Food Safety Authority (£102K); UK Government bodies (NIHR £2.2M, Norfolk PCT £268K, Technology Strategy Board £89K); and industry (including Unilever £286K, Coca-Cola £157K, GSK £87K, Bristol-Myers Squibb £174K, Barry Callebaut £76K).

Infrastructure and facilities: The Nutrition department has access to an impressive array of infrastructure and facilities, including:

Clinical trials facilities: We have access to two clinical research facilities: an NHS facility based across two sites one within the Norwich Medical School (for free living interventions in healthy/ 'at-risk' individuals); and the other within the NNUH (6 bedded facility for invasive studies and clinical assessment in healthy/patient groups). The second is the human nutrition unit at the IFR (complex food based interventions). The Norwich Medical School has provided us with support to develop the infrastructure to assess vascular function, bone density and body composition (£250k). We work with the Norwich CTU on international trials which require CTU support for study design, remote electronic data capture for patient registration, randomisation and data management.

MRI Scanner: UEA and NNUH have together co-funded the development of a 3T MR scanner (commissioned 2012) for research purposes. This important development will allow us to conduct world leading research on diet, cardio-metabolic and cognitive health, allow us to recruit and retain the best researchers in the field and secure substantial additional research income.

Core shared NRP laboratory facilities: All wet laboratory, cell culture and human sample analytical equipment is housed in the Biomedical Research Centre, a £16.5 million investment between the Norwich Medical School and the Biological Sciences School, which provides facilities for 200 researchers. Core facilities include DNA sequencing, mass spectrometry, extensive microscopy, all standard molecular and cell biology facilities, an IL650 autoanalyser for high throughput analysis of biological samples, and *The Wellcome Trust SRIF-funded Disease Modelling Unit*, a germ free facility (one of very few in UK HEIs) for housing, wild-type, transgenic and gene knockout models.

Another major new joint initiative with the NNUH is the construction of a new £19m, 4400 sq m, research building, partially funded by the Wolfson Foundation, which will advance our research scope, collaboration and integration. The Government's recent £26 million investment in NRP for scientific infrastructure will also support and develop enterprise and drive innovation through the nurturing of start-ups and SMEs, and the licensing of technologies invented on NRP to specialist companies.

Genome analysis: The recently established *BBSRC Genome Analysis Centre*, specialising in genomics, including DNA sequencing, whole genome scale analysis and associated bioinformatics, considerably expands our current capabilities in nutrigenetics.

Support for research: The *Medical Statistics Group* within NMS provides specialist support for study design, data analysis and bioinformatics, and our work on patients/'at-risk' individuals is conducted in collaboration with our clinical colleagues.

e. Collaboration or contribution to the discipline or research base

We collaborate widely with world-leading academics in our field, with US and EU industrial partners and international government agencies. These collaborations are actively encouraged by the School's positive grant winning and project management culture, by strategic decisions made within the School and by our internal management processes. During the assessment period we have published with numerous US and EU Universities, and locally with researchers in other Schools or institutes within NRP. Since 2008, we have published 25 papers in the Am J Clin Nutr, the premier journal for nutrition research (15 of these since 2010). Three of our systematic reviews underpinning WHO guidelines have been published in the BMJ.

Some specific examples where we have played a *leading role* are detailed below.

Major (>£1million or >10 publications) International & National Collaborations:

- The Plant Bioactives & Health BBSRC Programme grant (PIs Cassidy and Minihane)
- Health benefits of dietary flavonoids with the Harvard School of Public Health (PI Cassidy)
- Bioactivity and bioavailability of flavonoids (PIs Kay and Cassidy)
- Clinical Trials in cardiovascular health (PIs Cassidy, Minihane)
- Optimal micronutrient reference values for health (PI Fairweather-Tait)

Strategic Long-term Collaborations: In order to undertake nutrition research of the highest academic quality we have established a number of strategic collaborations including:

- Harvard, EPIC, Tufts (Framingham) USA, TwinsUK (genetics / nutritional epidemiology)
- University of Illinois, Chicago, US (rodent models of dementia)
- HarvestPlus, US; ETH Zurich (mineral biofortification, metabolism)
- Massey University NZ (genotype and dietary lipids, iron absorption)
- Institute of Food Science and Nutrition, Kiel, Germany (*APOE* genotype and health)

Collaborations with industry, government and other research users: Our links with government agencies, national and international policy providers such as the EU Food Safety Authority, WHO Nutrition Guidance Expert Advisory Group, NIHR, The UK Department of Health; nutrition science communicators such as The European Food Information Council, the British Nutrition Foundation, the International Life Sciences Institute; the food industry including specific links to Unilever Research, GSK, Pepsico, BMS, Abbott Nutrition through ongoing research grants and collaborations, all ensure that key findings from our research are rapidly and effectively translated into public health benefit.

Selected indicators highlighting our contribution to the discipline are:
Leadership in Government, Industry and Professional Bodies:

- REF Subpanel member UOA 3 and UOA 6 (Cassidy and Minihane)
- WHO Nutrition Guidelines Expert Advisory Group (Hooper and Fairweather-Tait, 2012-)
- EFSA Panels (Fairweather-Tait, 2009-15; Cassidy, 2009-11)
- EU grant committees - Academy of Finland, Swedish Research Council (Cassidy, 2008-)
- BBSRC Committees (Fairweather-Tait, 2006-09)
- Scientific expert ILSI EU and North America (Minihane and Cassidy)
- Scientific Governor, British Nutrition Foundation (Fairweather-Tait and Cassidy)

Editorial Boards of Journals:

- American Journal of Clinical Nutrition (Fairweather-Tait, 2006-12)
- Deputy Editor, British Journal of Nutrition (Minihane, 2012-)
- BMC Medical Genetics, BMC Musculoskeletal Diseases (Macgregor, 2008-)

Honours, Awards and Prizes:

- Royal Society Wolfson Research Merit Award Holder (Cassidy, 2013-18)
- Prize 'outstanding contribution to isoflavones research', Japan (Cassidy, 2008)
- Nutrition Society Silver Medal Award 'for scientific excellence in nutrition' (Minihane, 2008)
- Prize ' Clinical Research on Flavonoids', Argentina (Cassidy, 2013)
- Finalist, THE Awards, 'International Collaboration of the Year' (Cassidy, 2013)