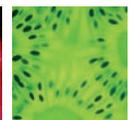


A recipe for **Success**



DRINC • DIET AND HEALTH RESEARCH INDUSTRY CLUB

A recipe for success

Consumer awareness of the importance of healthy eating is rising. The development of new food products, which enable people to make healthier choices, offers an increasing market opportunity for competitive product differentiation.

But producing healthier foods (including drinks) that are as palatable to consumers as their conventional counterparts is no easy task. There is a need for world-class research to address the issues and obstacles to the development of nutritionally enhanced foods and bioactive ingredients. This will enable the production of safe, nutritious high quality products.

The Diet and Health Research Industry Club (DRINC) was formed to unite innovative academic expertise to work on challenges relevant to the food industry, with mechanisms put in place to ensure UK companies derive a competitive advantage.

Since 2007, the Club has provided over £15M to enable high quality research into diet and health within UK universities and research institutes. Driven by the club members, the research is aimed at helping the food industry develop products that deliver enhanced health benefits for consumers. This research has generated underpinning knowledge and improved skills in a research community that provides valuable pre-competitive outputs for the UK food and drink industry.



Finding the best ingredients

With a strong emphasis on multidisciplinary research, the Club helps build research capacity to address industry-relevant challenges right across the food chain by encouraging new entrants and cross-boundary thinking.

DRINC plays an important role in the supply of skilled individuals for academic research and industry through its support for targeted PhD studentships and employment of post-doctoral researchers.

CASE STUDY: The benefits in the bean

Industrial processes such as roasting deliver the distinctive aromas and flavours that we associate with coffee and chocolate. They also change the chemical structure of compounds within the beans themselves, including flavanols which have been reported as having potential health benefits. But, despite there being scope to exploit these compounds for cardiovascular and mental health, little is known about the impact that processing has on these beneficial effects.

In a DRINC-funded project that combined flavour chemistry with nutrition science and gut microbiology, researchers at the University of Reading have been investigating the effects of processing on the bioactivity of cocoa flavanols and their derivatives. Led by Professor Jeremy P E Spencer, they have found evidence that light processing has minimal impact on the favourable effects of cocoa on vascular function, whereas heavy processing seemed to abolish them – a similar effect was observed with coffee as part of a related CASE studentship project. The team also discovered the first evidence that cocoa flavanols can have a prebiotic-like effect: modifying the ecology of microbial populations within the colon in a positive way.

In addition to the varied research findings, the multidisciplinary nature of the project has paid dividends to postdoctoral researcher Dr Maria Jose Oruna-Concha who was recently appointed as lecturer by the University.

“The University was looking for someone who could interact with researchers across the whole department, so my involvement with DRINC made a big difference to my tenure. The relationships I have built through DRINC will help to build my own research group and I hope to be collaborating with other researchers in my department, in other universities and in industry in the near future,”
Dr Oruna-Concha explains.



Our method

DRINC's steering group provides members with an effective mechanism to shape the Club's research agenda to meet the needs of industry.

And with its diverse research portfolio, DRINC provides a channel for companies to access excellent science (as judged by peer review) early on, and to identify new research and innovation opportunities, without being constrained by the remits of individual projects or funders.

With 90% of the Club's funding from Research Councils, members have greater opportunities to leverage pre-competitive research not readily available in their own organisations or within their own funds.

CASE STUDY: Would you like to supersize that?

Decisions about portion size have a major influence on the number of calories we consume. And it appears that our expectations of satiety – how filling a food is – can have a major influence on how much we put on our plate and, ultimately, how much we eat.

Professor Jeff Brunstrom at the University of Bristol is leading a DRINC-funded project to uncover the origin of these expectations and to understand how they might be learned over time. This has led to the development of a new methodology – the consumer expectation toolbox – which has already been used by industry, to explore the expected satiety of products, and in a clinical setting, to assess food reward and expected satiety before and after gastric surgery.

As part of a new BBSRC-funded LINK project with Nestlé, Professor Brunstrom will build on this body of evidence by exploring whether patterns of eating behaviours (bite size, eating rate, inter-bite interval, etc.) manifest themselves in the expected satiety of foods from meal to meal. The research brings together Nestlé's expertise in eating behaviour research with the Brunstrom lab's approach to understanding portion size and expectations of satiety.

“By understanding eating behaviour, we hope this research will lead to new ways to prevent and treat obesity either through modifying eating behaviours directly or by developing foods that encourage specific patterns of eating,” says Prof. Brunstrom.



Just mix

The Club supports a vibrant, well-connected community that both the academic research base and industry can associate with. Regular networking and dissemination events help to develop synergies between projects and to foster new partnerships, which in turn can seed wider collaborations.

Partnerships and collaborations built through DRINC enable members to leverage additional research and innovation funding, for example from Research Councils, the Technology Strategy Board, the EU and beyond.

CASE STUDY: Overeating – it's not one size fits all

Funded by DRINC, Professor John Blundell's team at the University of Leeds has combined expertise across a wide range of research disciplines in order to develop a sophisticated research platform to identify causes of overeating. Through detailed measurements of variables such as body composition, satiety peptides and behaviour in obese subjects, the study has produced findings and a degree of understanding that wouldn't have been arrived at by looking at normal cause and effect relationships, such as the link between fat free body mass and appetite.

The sensitivity of the methodology has led to collaborations on two parallel DRINC projects investigating satiety. One with Imperial College London is looking at the effects of propionate production in the colon and on insulin sensitivity and appetite. The second at the Institute of Food Research is investigating the effects of novel fat emulsions on satiety.

In unravelling the complex sets of factors controlling overeating, Blundell's team has also discovered that people respond in different ways. For example, working with scientists at the Karolinska Institute in Sweden, they found that different patterns of the hunger hormone ghrelin and satiety peptides PYY and GLP1 can elicit the same suppression of hunger or the same increase in fullness in different people. According to Blundell, this has had a major effect on the way the team conducts research and interprets outcomes: "We're now orientating our research to place much more attention on the variability of outcomes in individuals, rather than the average outcome."

The philosophy of this approach has generated a lot of interest from researchers across the globe and has led to invitations to join two EU Framework Programme 7 consortia (full4health and SATIN – Satiety Innovation) which have a strong emphasis on interactions with industry. In addition, Blundell has joined forces with the US National Institute of Health to look at the effect of portion size and food composition on overeating.

"The great thing about the DRINC study is that it gave us the capacity to think in a big way about a project that had real scope and wasn't limited to some smaller, rather tangible issue,"
says Prof. Blundell.



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We're not half baked

“It’s a common misnomer that there is no room for scientific research within the food industry; there is clearly a market for the development of products that deliver convincing health benefits. DRINC has really opened our eyes to the diversity and quality of food-related research in the UK, allowing us to explore new avenues, make new links and forge significant partnerships.”

Mark Fowler, Head of Science at Nestlé Product Development Centre, York and Chair of the DRINC Steering Group

CASE STUDY: Validating health claims – here comes the science

Convincing investors to back expensive clinical studies can be difficult without a really good scientific understanding of the health benefits associated with a product – and they probably stand less chance of being successful. Over 95% of health claims for food products are currently rejected by the European Food Safety Authority (excluding claims on vitamins and minerals). Often this because there is limited scientific evidence on the health claim, or the link between the health claim and the active ingredient in the food is not clear.

Funded by DRINC, Professor Paul Thornalley from the University of Warwick has developed robust new screening technologies and biomarker assays to assess the beneficial effects and aid the design, of new functional foods for healthy ageing. This followed on from earlier research by Thornalley and his Medical School colleagues, which suggested the progression of diabetes and vascular disease might be kept at bay by stimulating the production of protective enzymes. By bringing in expertise from crop scientists and mathematical modellers, the DRINC project demonstrated that bioactive compounds in fruit and vegetables can act as potential inducers of these enzymes. They also found that, in some cases, levels of potentially beneficial compounds varied depending on the variety grown and tended to be higher in crops grown in the field as opposed to the glasshouse.

“We were then in a position to consider optimising the levels of these compounds in fruit and vegetable products and therefore produce novel functional foods,” explains Prof. Thornalley.

Thornalley’s team is now working with Unilever to bring leading compounds to the marketplace as part of a Nutrition for Life project, supported by the Technology Strategy Board. They’re also a partner in a 5-year EC FP7 project, BIOCLAIMS, to develop biomarkers for metabolic and vascular health. By incorporating robust measures to assess the health benefits of potential products, Thornalley is confident that they stand a good chance of success.



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The proof of the pudding...

A recent independent evaluation has recommended continuation of the Club to benefit UK industry by maintaining the UK's strength in diet and health research. Discussions are now underway to develop the next phase of DRINC with an anticipated launch in November 2012.

CASE STUDY: Health by stealth

Many people are aware of government guidelines for a well-balanced diet: to eat plenty of wholegrain foods, fruit and vegetables. But with busy lifestyles often prioritising convenience over health, the search is on for new food products that can deliver the same benefits, and which could even help people to lose weight.



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Researchers at Newcastle University are studying the capacity of dietary fibre to help people feel fuller for longer and thereby aid weight management. In particular they've been looking at alginates in seaweed, which are already a common ingredient (as a fat replacement) in many processed foods. But interestingly, according to postdoctoral researcher Dr Matt Wilcox, by adding alginates to foods there may be a way to keep the fat content the same and still lose weight.

Previous research led by Professor Jeffrey Pearson has shown that some alginates can inhibit the action of pancreatic lipase so that less fat is digested. Now, as part of a DRINC-funded project, Pearson's team has developed an alginate bread, which they tested in a model gut system that mimicked the chewing, gastric and intestinal processes. They showed that alginate is released from bread in the intestinal phase where lipase is most active. What's more, a subsequent acceptability study, using bread supplied by local baking firm Greggs, demonstrated that alginates had no adverse effects on people, such as those associated with some weight management products currently on the market.

"We've also found that, not only do people not mind the taste of the alginate bread compared to ordinary bread, they prefer it. This is very encouraging as we look to further develop alginate food products, building on the links that we have forged with industry," says Prof. Pearson.

Managed by BBSRC, DRINC is a partnership between the Research Councils and a consortium of companies with interests in the development of food and drink products that deliver health benefits for consumers.



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November 2012

Cover image © Institute of Food Research, where a collaboration spanning more than 20 years has led to the successful launch of a consumer-focused, nutritionally-enhanced 'super broccoli'.

Produced by RCUK's internal service provider