Introduction

As the ‘good food vs. bad food’ debate becomes a growing national preoccupation, what role should science and evidence play in the choices we make about food?

The General Advisory Committee on Science (GACS) was established in December 2007 to give independent challenge and advice to the Agency on how it obtains and uses science. Issues around how to identify, weight and use different types of science and evidence are central to the role of the GACS role.

The GACS hosted this panel debate, in tandem with its first meeting, to help it explore these issues, engage with different perspectives, and frame questions for future discussions. The debate formed part of National Science and Engineering Week 2008.

The debate was chaired by Professor Colin Blakemore, Chair of the GACS, and facilitated by science writer and broadcaster Vivienne Parry. A panel of three leading science practitioners and commentators – Professor Kay-Tee Khaw, Professor Erik Millstone and Dr Ben Goldacre – gave presentations outlining key aspects of the debate as they saw them. An open discussion with the panel and an audience of about 90 (including many of the members of the GACS) explored these issues and raised further points.

This report has been prepared by the GACS Secretariat to summarise the main points and questions that arose in the presentations and discussion. These will be used by the GACS in its work to challenge and advise the Agency on how it uses scientific evidence and advice.

The programme for the day is at Annex 1. Biographies of the panel members and further background to the GACS is at Annex 2.
The questions shown below were suggested to stimulate discussion and provide some framing and context for the discussion.

**Should we trust what scientists say about food?**

**Some possible questions**

**What's so special about science?**
- Individual expertise? Transparent processes? Robust analysis of evidence?

**Which evidence is most important?**
- Is some evidence more important than others? Peer reviewed studies - anecdotal evidence?
- What weight of new evidence determines a tipping point for action?
- How to reflect uncertainty, diversity of opinion, divergent views, and challenges to orthodoxy?

**Asking the right questions?**
- How are wider issues and concerns used to frame questions for risk assessment?
- What might we be missing by focusing on the ‘hard science’?

**Making a judgement – how much does science count? What else should be considered?**
- Science is fundamental, but only part of picture?
- How to consider other evidence - individual liberty, risk tolerance, etc.?
- How can we make sure we get and use all the different types of evidence properly?
- How do we engage with wider opinion, challenge and debate?
Outline of panel presentations

Professor Blakemore’s opening remarks were that food is clearly of central importance in all our lives, not just for our health but also for cultural, social and many other reasons. The science of food and its relation to health is incredibly complex. In a sense we all take part in a huge experiment on the effects of diet on health every time we eat. The Food Standards Agency has committed itself to working from a robust and open evidence base, and has established the GACS to provide independent challenge to how the Agency uses science in this process. The GACS met for the first time on the morning of the debate, and was very clear that it needed to do this openly and independently. Part of this was to open its work out beyond the confines of the committee room (albeit one open to the public) and engage with wider expertise and opinion. This debate was symbolic of this: he and the Committee looked forward to hearing some firm and well-informed views, not all necessarily complimentary. The GACS would learn from this, and the debate would inform its future work.

Professor Khaw discussed the value and use of observational studies, drawing on recent work by the Academy of Medical Sciences (AMS). Competing and conflicting claims of links between diet and health are published almost daily. How can we make sense of this and decide which evidence is reliable enough to justify interventions through advice or policy? Since we cannot experiment directly on people, for practical and ethical reasons, we rely largely on observational and other ‘non experimental’ studies. These may suggest associations, but do not in themselves prove causality.

The AMS working party looked at observed associations that have stood the test of time and for which there is a consensus that they do indicate a causal relationship, and others which are not now thought to be casual. The case for causality was more robust where there were large effects, reproduced consistently across many studies, different research approaches, and different population, with good experimental design, peer review and publication. Factors indicating a need for caution included small studies, one-offs, susceptibility to bias and confounding factors, and the involvement of major commercial or other interests. However, even where all these positive criteria are fulfilled, there will always be uncertainty – this does not mean we should not act, but that we need to make clear the basis for acting and to continue research to evaluate and understand the impact of action and to address uncertainties.

1 A summary of the AMS working party’s work and a link to the full report are at Annex 2.
Professor Millstone challenged the question framing the day, noting that science is not monolithic, and scientists do not speak with one voice. He recast the question as ‘under what conditions should citizens trust what FSA expert advisory committees say about food?’, answering this by looking at the role of science in policy making, as illustrated by three risk assessment models.

The ‘technocratic model’ posits that ‘science’ stands apart from and informs ‘policy’ in a one-way process. This is flawed: science is often incomplete, equivocal and uncertain, and policy judgements must take into account non-scientific factors. It was superseded by a ‘decisionist’ model in the 1980s/90s, which sees a sequential process of risk assessment (science) influencing risk management (explicitly including values and practicalities), which in turn influences risk communication (where social sciences have an input). This remains flawed as it ignores the fact that many uncertainties and features of the ‘science’ arise from non-scientific assumptions that frame risk assessments – such as their scope (risks/benefits, short-term/long-term) and the types of evidence considered and how they are interpreted. A third, ‘co-evolutionary’ model attempts to address these issues, acknowledging the reciprocal links between science and policy. Here risk assessment policy (including social and political factors), expert assessment (drawing on scientific factors) and policy making (drawing on technical, economic, social and political factors) all influence each others. This model indicates structures through which policy making can become democratically and scientifically legitimate.

Professor Millstone noted that the Agency developed procedural guidance for risk assessment policy in its 2002 Report of the Review of Scientific Committees.² He suggested that a key task for the GACS is to ensure that all Advisory Committees advising the Agency had clear guidance on risk assessment policy from the Board of the FSA and that they all demonstrably follow it in practice. Areas for attention include consistent reporting of assumptions and uncertainties, and ensuring that possible false negatives and possible false positives are challenged with appropriate rigour.

Dr Goldacre spoke about the tension between the uncertainties of evidence, and the certainty demanded by the public and the media. We must accept that we live in a world where firm authoritative statements are confidently made in mass media on the basis of little evidence, and that problem will not go away, but also that decisions about food are about much more than just the science.

The focus on food as a modifiable risk factor, about which individuals seek to make informed choices, itself reflects a particular view which may obscure other, potentially more useful types of interventions, for example at the societal level, or on other lifestyle risk factors for ill health which may be more important. Key to introducing some balance is the ability to ‘drill down’ to original information and source data, so that we can form our own views and discuss openly what research has been done and how it might be interpreted. Not everyone wants or is able to do this, but there is an audience for it, and they should not be neglected. This gives us an opportunity to present information in more challenging ways, for example explaining the strengths and weaknesses of different types of trials and evidence, and giving people the tools to be able to check back and evaluate the evidence for themselves. Evidence is always going to be incomplete and uncertain, so we should be open about the uncertainties and also about the other factors necessarily taken into account in making decisions.

**Key points from the discussion**

The panel and audience discussed the points raised in the panel’s presentations, and a number of other issues. The key points and questions are summarised below.

**Uncertainty and communication**

- Science and scientists do not speak with one voice.
- It is important to be open and clear about uncertainty, both in the science process itself and in how decisions and the evidence behind them are communicated. This includes explaining that advice and decisions may change in the light of new evidence – and what is being done to collect and review that new evidence.
- There needs to be a clear ‘audit trail’ and explanation of how we get from the science to a decision. Explaining the range of opinions around the science could be part of this.
- There is a challenge in communicating clearly and accurately in the face of the apparent demand for simple messages.
- Views differed on the extent to which the public – or different publics – want certainty, or are comfortable with uncertainty. Certainty in the form of simple messages was often attractive to politicians, the media and industry. However, consistent handling and communication of uncertainty needs to reflect the complexity of the issues, and allow those who want to explore the detail to do so.
Identifying and weighing different types of evidence

- Evidence is often equivocal and apparently conflicting. The best way to address this and evaluate evidence and claims made for it is to debate it head on, in public.

- A key part of this is being able to ‘drill down’ to the original information and how it has been handled.

- Open access publication facilitates access and scrutiny of source data.

- Peer review is a valuable tool to indicate some form of quality control, although it is not perfect – for example it is not transparent and may be prone to error or bias.

- Peer review for publication can act as a delay to making information available for wider scrutiny including for risk assessment. This is a challenge for regulators.

- It is important also to give the public the tools to be able to challenge and to ask the right questions. This includes discussing the background – the nature of different types of study, their inherent strengths and weaknesses.

- How can we be sure that all relevant information is available and considered (for example in a risk assessment for a new product or evaluation of a new health claim)? Recent initiatives in the health area require those conducting clinical trials to register them before they start, as a prerequisite for their subsequent acceptance for publication. Could/should a similar system be applied to trials in the food area?

- How does the Agency balance the value and challenges offered by different types of study – for example observational versus intervention studies?

- Is it possible to develop consistent approaches to how different types of evidence are handled and at what point different types of evidence reach a ‘trigger’ for specific actions? How does the context in which evidence is used affect this – for example advice to individuals versus interventions affecting the population; approval of a new product versus withdrawal or ban?

- How should the Agency capture and assess anecdotal evidence? The yellow card system exists for reporting adverse reactions to medical treatments. Is something similar possible for foods?

- Evidence on evaluation of the effects of new policies and foods should have more attention.
In closing, panel speakers were asked to pick one key message for the GACS to take from the event. These were:

- **Professor Khaw**: Ensure you are transparent about the arguments for making recommendations, and what the uncertainties are.

- **Professor Millstone**: To ensure that all the expert advisory committees advising the Agency follow the procedural rules set out in the 2002 Review of Scientific Committees.

- **Dr Goldacre**: Show your working and make it possible to drill down to original methods and results: publish what you did, why you made those decisions, explain the kinds of studies you looked at, and give links to the original data.

**What happens next?**

The issues raised in the debate are summarised and published in this report. The GACS will consider these issues as part of its future discussions, and in challenging and advising the Agency on how the Agency uses scientific evidence and advice. These discussions will be held in open session, and papers and minutes will be published.

Copies of the presentations will be published on the Agency’s website.
Annex 1:  
**Should we trust what scientists say about food?**  
A panel debate hosted by the General Advisory Committee on Science (GACS)  
Tuesday 11 March 2008, 2pm to 4pm

**Programme**

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| 13:30 | **Registration**  
                               Coffee and refreshments available |
| 14:00 | **Welcome**  
                    Dr Andrew Wadge, Chief Scientist, Food Standards Agency |
| 14:05 | **Introduction**  
                      Professor Colin Blakemore, Chair of the GACS |
|       | **Presentations from panel members**        |
| 14:15 | Professor Kay-Tee Khaw, FMedSci, Academy of Medical Sciences |
| 14:25 | Professor Erik Millstone, Science Policy Research Unit, University of Sussex |
| 14:35 | Dr Ben Goldacre, author of the 'Bad Science' column in *The Guardian* and at [www.badscience.net](http://www.badscience.net) |
| 14:45 | **Discussion**  
                      Responses from panel, and panel and audience discussion |
| 15:45 | **Summing up**  
                      Professor Colin Blakemore, Vivienne Parry |
| 16:00 | **Close**  
                        Coffee and refreshments available |

**Practicalities**

The event was held on the afternoon of 11 March, at the Royal College of Physicians, 11 St Andrews Place, Regent’s Park, London, NW1 4LE.
Annex 2
Biographies of panel members

Professor Colin Blakemore (panel Chair), FMedSci, FI Biol, Hon FRCP, FRS, is Chair of the General Advisory Committee on Science. He studied Medical Sciences at Cambridge and completed his PhD at the University of California in Berkeley. After 11 years in the Department of Physiology at Cambridge University, he became Waynflete Professor of Physiology at Oxford University in 1979 and continues to hold this post. From 1996–2003, he was Director of the MRC Centre for Cognitive Neuroscience at Oxford. His research has been concerned with many aspects of vision, early development of the brain and plasticity of the cerebral cortex. He was Chief Executive of the MRC from 2003 to September 2007.

Professor Blakemore was President of the British Association for the Advancement of Science in 1997-1998 and Chairman in 2001-2004. He is committed to promoting dialogue between scientists and the public, and a frequent contributor to radio and TV, including the 13-part BBC2 series The Mind Machine. Books for the general public include Mechanics of the Mind (which won the Phi Beta Kappa Award in Science), Images and Understanding, Mindwaves, The Mind Machine, Gender and Society and The Oxford Companion to the Body.

Professor Blakemore is former President of the British Neuroscience Association, the Physiological Society and the Biosciences Federation. Prizes received from medical and scientific academies and societies include the Robert Bing Prize for Neurology and Physiology (Swiss Academy of Medical Sciences), the Prix du Docteur Robert Netter (Académie Nationale de Médecine, France) for research on developmental disorders of vision, the Norman McAlister Gregg Award in Medical Science (Royal Australian College of Ophthalmologists), the international Alcon Prize for vision research, and the Royal Society’s Michael Faraday Prize and Medal.

Vivienne Parry (facilitator) is a writer and broadcaster. A scientist by training, she writes and presents the multi award winning series 'Am I normal' and 'Inside the Ethics Committee' for Radio 4, as well as many other programmes. She is a columnist in the Body & Soul section of the Times and contributes features to the Times and many other newspapers and magazines, including Good Housekeeping where she is Science Editor. In the past she has presented Tomorrow's World, reported for Panorama and been the columnist of the News of the World.
Professor Kay-Tee Khaw, CBE, FMedSci (panel speaker) is a principal investigator in EPIC-Norfolk study. She first became interested in diet and health when investigating reasons for the rise in blood pressure and rapidly changing patterns of cardiovascular disease in different communities around the world, including Kenya and the Caribbean. The wide geographic, social and secular variations in most chronic diseases associated with aging including cardiovascular diseases, cancer and osteoporosis suggest a substantial proportion of disabling conditions are potentially preventable. EPIC-Norfolk aims to identify what we can do to maintain health in the population.

Kay-Tee trained in medicine at Girton College, Cambridge and St. Mary's Hospital, London and in epidemiology at the London School of Tropical Medicine and Hygiene, with subsequent clinical and academic posts in the University of London and the University of California San Diego. She is currently Professor of Clinical Gerontology in Cambridge and a Fellow of Gonville and Caius College, Cambridge.

Kay-Tee is a Fellow of the Academy of Medical Sciences and was a member of the working group that produced the report 'Identifying the environmental causes of disease: how should we decide what to believe and when to take action?'

Summary of the report on 'Identifying the environmental causes of disease'

In 2006 the Academy of Medical Sciences established a working group on research into the environmental causes of disease. Its objective was to address increasing scepticism amongst professionals and members of the public that had arisen when claims from one such study were so soon reversed by those of another. For instance, until recently hormone replacement therapy was thought to protect against cardiovascular disease but it is now thought to be a risk factor. Nevertheless, in some cases, such as the link between smoking and lung cancer, research on the environmental causes of disease has clearly been of great value to public health.

The final report of the working group sets out five key recommendations and offers guidelines for the wide range of stakeholders involved in generating, communicating and translating research into the environmental causes of disease into policy and practice. A synopsis, summary of the stakeholder workshop that informed the working group's discussions and press release accompany the report. Further details are available from: http://www.acmedsci.ac.uk/p47prid50.html
**Professor Erik Millstone (panel speaker)** is a Professor of Science Policy at the University of Sussex, leader of the Environment and Energy group at the Science Policy Research Unit (SPRU) and is Director of Studies for the post-graduate programme in Public Policies for Science, Technology and Innovation.

- His first degree was in Physics; he then gained three post-graduate degrees in Philosophy.
- Since 1974 he has been researching into the causes, consequences and regulation of technological change in the food industry.
- From 1998 to 2004 he researched the links between science and policy-making in relation to Bovine Spongiform Encephalopathy on European Commission funded projects.
- He was the principal investigator on a European Commission funded 9-country comparative study of obesity policy from 2003-2007.
- He also lead a comparative study from 2004 to 2007 of the relationships between science and food safety policy-making, looking at the global Codex-based regime, as well as the UK, USA, Germany, Japan and Argentina.
- He has recently embarked on a five-year UK research council funded project concerned with ways of reconciling improved agriculture, health, water management and environmental sustainability in developing countries.

**Ben Goldacre (panel speaker)** is a medical doctor from the UK who writes the "Bad Science" column in the Guardian newspaper, examining the claims of scaremongering journalists, quack health products, pseudoscientific cosmetics adverts, and evil multinational pharmaceutical corporations. He appears regularly on radio and TV and has won numerous awards for his work, which is archived at badscience.net. The book Bad Science will be published by 4th Estate in June 2008.

**The General Advisory Committee on Science (GACS)** is an independent committee established in December 2007 to provide challenge and advice to the Food Standards Agency on how the Agency obtains and uses scientific evidence and expertise. It comprises an independent Chair and fifteen members: the Chairs of the nine scientific advisory committees that advise the Agency; four additional expert members; and two lay members. Further information about the GACS is available at its web pages at [www.food.gov.uk/science/ouradvisors/gacs/](http://www.food.gov.uk/science/ouradvisors/gacs/), or from the GACS Secretariat:

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