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<b>Authors(s)</b>	Gormley, T. R. (Thomas Ronan)
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# A Structured Debate on the Safety of Red Meat

R. Gormley

A structured debate was held at The National Food Centre, Teagasc between 17 consumers and 3 scientists/experts on the safety of red meat as part of the ongoing FLAIR-FLOW 4 dissemination project. The areas of BSE (bovine spongiform encephalopathy), CJD (Creutzfeldt-Jacob disease), meat and bonemeal, meat traceability, ritual vs conventional slaughter, antibiotic residues in meat, the effects of freezing and cooking on *E. coli* O157:H7, and lastly cross-contamination of meat at retail outlets were debated in-depth. The consensus was that red meat is safe, provided the necessary safeguards and codes of practice are adhered to. The interaction, intensity and depth of the debate was excellent and both the consumers and scientists/experts found it an informative exercise.

## Background

Lectures and presentations by scientists/experts to information end-users (e.g. food companies, health professionals, consumers, students, etc.) is a long-established and well-proven dissemination route for technical and related material. The procedure is normally a formal presentation followed by a short discussion. However, this may not be sufficient in the current climate of food scares, transparency and the ever-increasing need for more informed debate on a whole range of issues concerning food. For these reasons, a series of structured debates on a range of topics has been initiated Europe-wide as part of the FLAIR-FLOW 4 dissemination project. This article outlines the procedures and outcomes of a FLAIR-FLOW debate held at The National Food Centre in December 2001 between a group of consumers and three experts on aspects of *The Safety of Red Meat*.

## FLAIR-FLOW debates

The FLAIR-FLOW 4 dissemination project is ongoing (2001-2003) in 24 European countries, including Ireland (see page 39). Its main task is the dissemination of results from EU-supported food R & D to small and medium sized food companies (food

SMEs), health professionals, and consumer groups (see FLAIR-FLOW outputs on [www.flair-flow.com](http://www.flair-flow.com)). An accompanying task is to organise 72 structured debates between end-users (SMEs, health professionals, consumers, i.e. one debate per end-user group per country per annum) and experts on a range of topics selected by the end-user groups. The novelty of this approach is that the

end-users take on a proactive role and interrogate the experts on a range of pre-selected questions for the full duration of the meeting. The expected outcome is better end-user knowledge of current or 'hot' issues and an increased appreciation of both the success and difficulties facing scientists/experts in giving definitive answers to some of the complex issues in food production, food storage, food science and technology, food safety, human nutrition and consumer perceptions. A compendium of the outcomes of the 72 debates will serve as a blueprint for more extensive structured debates throughout Europe on a range of issues, thereby increasing trust and understanding between end-users (and especially consumers) and the scientific and technological community.

## Procedures and schedules

*Step 1: Selection of consumers and experts:* The external taste panel of The National Food Centre (mostly housewives from the vicinity) was used as the consumer group together with some of their friends and relations. The group comprised 15 females and two males who were familiar with group discussions. The three Irish scientists/experts were



CJD, the human form of BSE, is highly unlikely to be contracted from steak, as the prion has never been found in bovine muscle.

chosen based on their track record and experience in the area of the debate topic.

*Step 2: Selection of the debate topic:* The 17 consumers met at The National Food Centre (meeting 1; R. Gormley acted as moderator) in November 2001 and each was asked to write down a 'food issue' that concerned her/him. The responses were collected and the consensus was that the debate topic should be on *the safety of red meat*. The full range of topics mentioned by the consumers is given in Table 1 and the experts were NOT present at meeting 1.

*Step 3: Awareness documents:* Six documents on the safety of red meat were circulated by post to the 17 consumers to increase their knowledge and awareness of the area. The documents dealt with *E. coli* O157:H7, BSE (bovine spongiform encephalopathy), general hygiene and microbiology, and ranged in style from popular to applied science. The consumers were asked to read and study the articles and to initiate discussions on the topic in their own households and among friends in order to prepare for the next step of the debate process.

*Step 4: Selecting the debate questions:* The 17 consumers met with the moderator to select the questions for debate. This second meeting took place two weeks after the first, and one week after the reading material had been circulated. An active discussion took place and seven questions (Table 2) were drawn up for the debate.

The seven questions were pre-circulated to the three

**TABLE 2: Questions for debate between consumers and experts on the safety of red meat**

1.	How secure is the "30-month rule" (BSE); what happens to cattle older than 30 months; is there an 'age test' for cattle; when will BSE incidence fall dramatically in Ireland; is meat and bonemeal still being fed to animals?
2.	Is there a test for the BSE infective agent (prion) in live cattle and in retail beef cuts; can the prion be destroyed during meat cooking?
3.	How good is meat traceability; should the consumer pay more for safe beef?
4.	Would ritual (Kosher, Halal) killing be preferable in BSE terms to the use of the captive bolt (gun) method?
5.	What is the situation regarding antibiotics in red meat (beef, pork, lamb).
6.	Does freezing kill <i>E. coli</i> O157:H7 and other pathogenic bacteria; does cooking kill them and inactivate their toxins?
7.	How can the incidence of cross contamination of meats at retail outlets be reduced?

scientists/experts in advance of the debate in order to allow them prepare for the discussion.

**Step 5: Conducting the debate**

The debate opened with a *tour de table* and general introductions so that everyone got to know each other, thereby minimising formality. Each of the three experts gave their background and expertise and the debate proper then took place. The first question was introduced by one of the consumers and a highly interactive discussion took place with the experts responding and all the consumers joining in. The second question was introduced by another consumer and so on for all seven questions. The overall debate took three hours and the main outcomes are summarised below.

**Question 1: How secure is the '30-month rule'?**

BSE has presented many major difficulties and the focus has been on

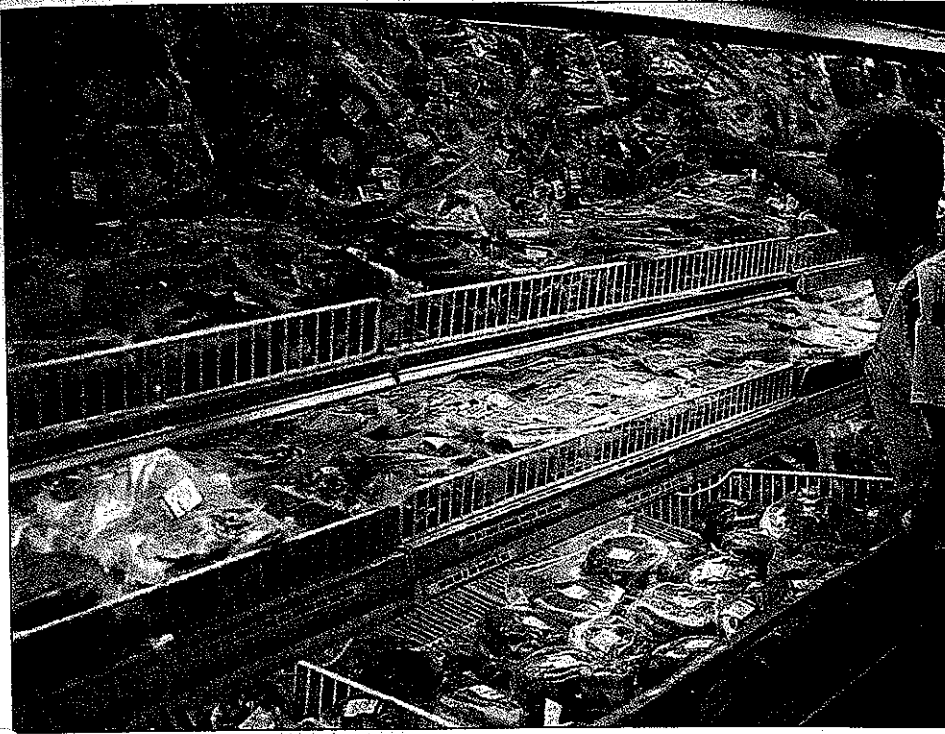
supporting both the producer and consumer. Cattle are now tagged at birth and a computerised database records the date of birth of each animal. Teeth are also used as an index of age  $\pm$  3-4 months. Identification of cattle for slaughter are checked against a database; any mis-match means rejection. In animals > 30 months the Enfer test is used. The prion is only detected in the central nervous tissue and infectivity is most likely to have been associated with products which contained nervous tissue such as mechanically-recovered meat. The human form of BSE, i.e. CJD (Creutzfeldt-Jacob Disease), is highly unlikely to be contracted from steak as the prion has never been found in bovine muscle (meat).

Possible misuse of the large stockpiles of meat and bonemeal now in existence was also expressed as a concern. Fifty per cent of an animal ends up as waste, and while the tallow is incinerated in Germany, the bonemeal is stockpiled in locked stores. Meat and bonemeal can be used in cement production but incineration is the 'real' answer; however, there is no incinerator in Ireland. Ireland has been audited for meat and bonemeal since 1998 and effective controls are in place.

It is anticipated that the incidence of BSE in Ireland will fall with time

**TABLE 1: Potential debate topics listed by 17 consumers (meeting 1)**

Topic	No. of consumers mentioning topic
1. Safety of red meat	5
2. Use and misuse of the word 'freshness'	3
3. Additives in processed foods	3
4. Dietary fats vs coronary heart disease	3
5. Food allergies	1
6. Eating fish vs sea and river pollution	1
7. Safety of microwaving foods	1



The scientific consensus is that freezing does not kill *E. coli* O157:H7. Thawing of frozen foods should be conducted in the fridge to minimise bacterial growth.

(time-scale unknown). The ban on feeding of meat and bonemeal to cattle was strictly enforced from 1996 and the majority of current cases are in older animals, which were fed meat and bonemeal earlier in their lives. However, since the debate, more animals, born after the meat and bonemeal ban in 1996, have been found to have BSE.

**Question 2: Is there a test for the BSE infective agent (prion)?**

There is no routine test for the BSE prion in live cattle or beef cuts. The Enfer test is carried out on the spinal tissue of dead cattle. However, a rapid test kit method is being developed, based on a urine sample, which may detect BSE in animals and CJD in humans (reported in the *British Medical Journal*, 2001, 323, 11). Freezing or cooking has no effect on the prion which is only killed by incineration.

**Question 3: How good is meat traceability?**

The beef traceability system is good and butchers are obliged to label the origin of beef. There can be difficulties in the boning hall, and ideally, carcass numbers being boned at any one time

should not exceed 20. However, a bar coding system is being developed which will be a further aid in traceability. There is relatively poor traceability for meats other than beef and considerable improvement is needed. The Food Safety Authority of Ireland (FSAI) recognises that the consumer is entitled to the maximum amount of useful information on food labels; the FSAI operates a helpline at 1890-336677.

On the topic of whether consumers should have to pay more for safe beef, the consensus was that all beef should be safe and processors and retailers should not be able to sell unsafe food. Veterinarians are present in all export abattoirs for meat inspection purposes, and environmental health officers make regular visits to food premises. In addition, EU regulation 2001/471/EC stipulates that hazard analysis of critical control points (HACCP) must be applied at abattoir level, and in this regard HACCP plans for beef, pork and lamb have been developed by The National Food Centre.

**Question 4: Ritual versus captive bolt slaughter**

This discussion point was based on a

consumer comment relating to a possible lower incidence of CJD in Muslim countries where Halal and/or Kosher slaughtering methods are used. The expert opinion was that it is difficult to tell if there is a lower incidence of CJD in Muslim countries, due in part to overall eating patterns. In theory, ritual slaughter might be better as the prion would not be dispersed in the bloodstream. In contrast, captive bolt slaughter results in the dispersion of brain tissue into the bloodstream. There are also ethical and animal welfare issues regarding ritual slaughter of animals in non-Muslim countries.

**Question 5: Antibiotic residues in beef, pork, lamb and poultry**

Sick animals require treatment with antibiotics. This is an animal welfare issue in addition to being an economic one. The important aspects are, firstly, how the antibiotics are used, and secondly, are there residues. Misuse or overuse of antibiotics in animals may give rise to antibiotic-resistant bacteria and so could have serious implications for human diseases. Residues relate to the time interval between administration and slaughter, and it all comes down to farmer responsibility, i.e. farmers should rigidly follow the advice given by the veterinarians who administer the drugs.

There is extensive testing for antibiotic residues in food in Ireland and in 2000 *circa* 48,000 pork samples, 3600 poultry samples and 2600 cattle samples were screened. The residue situation relating to pork is good but requires ongoing monitoring. Antibiotics are not an issue in Irish-produced chicken as withdrawal periods are closely adhered to. The safety of imported chicken was also raised at the debate. The expert response was that *circa* 33% of the chicken used in Ireland is imported. Whole chicken is likely to be produced locally but loose chicken fillets are imported from a number of countries, including Thailand and Brazil. The former has tight control on antibiotic residues. However, problems have arisen since the time of the debate with nitrofurans and

chloramphenicol residues in imported poultry and these are the subject of extensive testing in Europe.

Tests for antibiotic residues in food in Ireland are catered for in the National Residue Testing Plan which is coordinated by the Department of Agriculture and Food and comes under EC Regulation /96/27. The National Food Centre is one of the organisations conducting extensive residue testing under this scheme.

#### Question 6: Does freezing or cooking kill *E. coli* O157:H7 and its toxin?

The scientific consensus was that freezing does not kill this pathogen. Thawing of frozen products should be conducted in the fridge in order to minimise growth in bacterial numbers. Adequate cooking kills *E. coli* O157:H7 and its toxin. *E. coli* O157:H7 is ingested by humans either directly (from hand to mouth) by handling material or animals which have faecal contamination, or indirectly by eating contaminated food. The human stomach acid may kill *E. coli* O157:H7. However, survivors attach to the large intestine and produce a toxin after 10 days which can cause bloody diarrhoea and/or damage the kidneys. Young children and the elderly are most at risk and crèches and old folks homes are potential areas for outbreaks. Consumer concern was expressed concerning *E. coli* O157:H7 and other pathogens on rare steak. This is not a problem as any bacteria that may be present are on the surface and will be killed by cooking, provided temperatures are adequate for this purpose, i.e. 'flash' cooking may not suffice. However, degree of cooking is a big issue in mincemeat and burgers, and the centre must be adequately cooked as the bacteria occur throughout the product.

#### Question 7: How can cross-contamination of foods be reduced?

This specific question referred to the contamination of foods, especially meats, sold loose from retail outlets. The consensus was that cross-contamination is a big problem due to

dirty hands and drip from the meat. The recent outbreak of *E. coli* O157:H7 in Scotland was due to cooked and raw meats being sold side by side. Smaller shops find it more difficult to implement hazard analysis of critical control point (HACCP), and gloves on the server are not the complete answer; ideally, gloves should be changed between customers. The introduction of a HACCP approach combined with extensive staff training was advocated as a solution. Consumers can also help by reporting bad practices.

Concerns were also expressed about supermarket delicatessens in relation to salad bars and also the contamination of salad leaves by *E. coli* O157:H7. This can occur through the use of contaminated water for irrigation or washing the produce on-farm or elsewhere in the distribution and retailing chains. A good water supply is therefore essential and chlorination is effective against *E. coli* O157:H7.

#### Conclusions

- The consensus from the consumer/expert debate was that red meat is safe provided the necessary safeguards and codes of practice are adhered to.
- Ensuring safety in red meats and related products requires sustained and educated inputs from many individuals and organisations in the production, distribution and retailing chains. This also includes the final person in the chain, i.e. the consumer. Awareness and training programmes for all personnel involved is a top and ongoing priority.
- Feedback from consumers regarding malpractices in the food chain is a key element in improving safety. Consumers should become more proactive in this regard and organisations such as the Food Safety Authority of Ireland are there 'to protect', and are 'available' as listeners and also as instruments

of remedial action when it is required.

- The interaction, intensity and depth of the debate was excellent and both the consumers and experts found it an informative exercise.
- The output of this debate (and those from the 71 other scheduled debates Europe-wide as part of the FLAIR-FLOW 4 project) will serve as a blueprint for more extensive structured dialogue on a range of 'hot issues'. This will help to increase trust and understanding between consumers and the scientific community.
- The approach taken for the debate was novel and experimental. It is stressed that this text must be read in the context of a summary of a wide-ranging once-off structured debate between a small group of consumers and three scientists/experts.

#### Acknowledgements

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Dr. Ronan Gormley is Head of the Consumer Foods Department at Teagasc, The National Food Centre, Ashtown, Dublin 15. Telephone 01-8059500; e-mail: [rgormley@nfc.teagasc.ie](mailto:rgormley@nfc.teagasc.ie) He is also the Irish Network Leader for the 24-country FLAIR-FLOW dissemination project (website [www.flair-flow.com](http://www.flair-flow.com)).