Meat and protein – the future role for nutrition, health and wellbeing for Aberdeen Angus

Dr Alex Johnstone

The research leading to these results has received funding from the European Community’s Seventh Framework Programme and the Scottish Government.
Key points

- Protein is an essential nutrient for health and evidence will be discussed on how much and the source of protein, to contribute to a healthy, balanced diet, across the lifecourse.

- Red meat in a pure form is an excellent source of protein and essential amino acids, saturated fat, iron, zinc and B vitamins.

- The future role of Aberdeen Angus meat in a sustainable, healthy diet will be discussed, including consumer attitudes on purchasing patterns.

- Key messages on challenges and opportunities for the food sector will be highlighted.
• Research Scientist & Nutritionist
• Long-term diet trials to assess changes in energy balance & body composition
• Extensive use of the Human Nutrition Unit
• Collaboration with food industry sector
• Engagement with stakeholders
Protein is an essential nutrient for health—an excellent source of protein and essential amino acids, saturated fat, iron, zinc & B vitamins

‘Eat quality not quantity’ red meat for health

Protein intake from meat and Aberdeen Angus has an important position in a healthy diet across the life-course

Aberdeen Angus meat has key opportunities within the food sector
There is a long-standing assumption that meat & dairy products are good for human health

- UK dietary guidelines currently state: ‘Meat is a good source of protein in your diet, as well as vitamins and minerals’
- Protein is an essential nutrient providing amino acids required for normal human growth and development;
  - current UK recommendations for protein consumption woman (45g/d) and man (55g/d)
- Protein from red meat sources tends to provide a broader range of amino acids, which are easier for the body to digest than protein from plant-based sources
- Red meat sources tend to be micronutrient-rich foods, in particular iron (Fe), which plays a role in a number of essential functions in the body

There is a ‘Protein boom’...
• Consumers see protein as a part of a healthier living lifestyle

• ‘High-protein’ is moving from niches to mainstream in supermarkets

• More consumers become a “Flexitarian”
  - A semi-vegetarian or flexitarian diet is one that is plant-based with the occasional inclusion of meat

• Applied to more product categories for its health benefits

• “High Protein” product claim is increasing (nutrition)
  • But a EFSA approved health claim is still illusive


Consumer attitudes and purchasing patterns

Drivers of meat consumption (consumers): gender effects

- Those consuming meat more often typically young males from higher socio-economic groups
- Women aged 46–60 years from lower socio-economic groups consumed the lowest quantities of meat
- Overall, women reported consuming less meat than men, supporting gender differences in meat consumption previously identified
  - reinforcing the suggested link between ‘virulent masculinity’ and meat consumption
- Associations observed between gender and attitudes towards animal welfare and source of meat purchases were also in concordance with previous international findings from the UK and other high-income countries
  - women were significantly more likely to show concern over the source of their meat, and for animal welfare, than men

Red and processed meat intakes by gender (g/d)

Note: Includes data from composite dishes.

Overall mean intake in adults is 71g/day

SACN guidance

http://www.nutrition-communications.co.uk
Processed red meat intakes by gender (g/d)

Consistently lower for females

Overall mean intake in adults is 17g/day

http://www.nutrition-communications.co.uk
UK has lower intake than most other EU countries


http://www.nutrition-communications.co.uk
Drivers of meat consumption (consumers): age effects

- Older adults (61–91 years) display more concern towards the source of their meat and animal welfare
  - potentially influenced by memories of a food system in which meat was in short supply prior to, during and after World War II

- Pre- and post-war consumption data illustrate that UK meat intakes were lower than current levels
  - 58·5 kg/person per annum in the period 1934–1938
  - 44·8 kg/person per annum in 1942,
  - 84·2 kg/person recent data

- Although the war ended in 1945, meat continued to be rationed until 1954 and following the removal of rationing restrictions, meat prices soared
  - older adults may hold a greater appreciation of meat as a food source than younger consumers, with these attitudes flowing from their experience of contrasting food availability

- Respondents higher socio-economic group more likely to agree that they are very fussy about where their meat comes from
  - this arguably highlights the issue of cost as a barrier to lower socio-economic groups in making more selective purchases

- Level of education may play a role in respondents being conscious of the production source of their meat purchase

Protein intake - the amount required differs between individuals and at different life stages.

Individual requirements of each nutrient are related to a person’s age, gender, level of physical activity and health status.

- WCRF & WHO recommendations for cancer prevention encourage people to limit their consumption of red meat to less than 500g a week (with emphasis on less processed meat)

- From systematically reviewed evidence linking diet and food intake patterns to cancer risk

- Global patterns of meat consumption reveal trends towards increased meat consumption

- Consumption of red and processed meat has been associated with an increased risk of colorectal cancer


WHY DO SOME UK MEAT EATERS WANT TO REDUCE CONSUMPTION?

• Consumers that are actively trying to reduce red and processed meat intake:
  • Of 1141 consumers surveyed over one-third indicated they are trying to reduce their meat intake.
  • This was associated with
    • a desire to lose weight,
    • other perceived health benefits,
    • far fewer indicating concerns about the impact of meat production on the environment

Meat consumption plays an important role in meal formation and self-identity (including non-meat eating), further complicating the (micro-level) choices consumers face

How has this impacted on international advice?

- **EFSA** – no advice issued as yet
- **UK** – Eatwell Guide (2016): “*eat less red and processed meat*”; if you currently eat more than 90g (cooked weight) of red and processed meat a day, the Department of Health advises you cut down to 70g.
- **Nordic Nutrition Recommendations** – limit intake of red and processed meat
- **France** – eat meat, fish, seafood or eggs 1-2 times daily, alternating. Advice to reduce portions and choose lean cuts
- **WHO** – IARC full report expected this year; the advice from the WHO Working Group supports current public health recommendations to limit intake of red and processed meat.

http://www.nutrition-communications.co.uk
‘A sustainable diet is a diet that contributes to the good nutritional status and long term good health of the individual/community, and that contributes to, and is enabled by, sustainable food systems, thus contributing to long term food security and nutrition.’


- When UK consumers questioned about strategies for achieving reduction - *favoured meat-free days (or meals), rather than alternatives such as meat replacers or potential future options such as cultured meat or insects*

- The eating of insects as food is called, sort of clinically and unappetizingly, "entomophagy."
  - *the potential for insects to replace meat in the diet may be more acceptable in countries where there is already a tradition for their consumption*

### Top 10 protein sources in the UK (NDNS data)

1. Chicken and Turkey dishes  20.3%
2. Beef and Veal dishes 15.5%
3. Baked Beans 7.0%
4. Eggs 6.7%
5. Bacon and Ham 6.6%
6. Meat Pies and Pastries 6.3%
7. Oily Fish 5.4%
8. Sausages 4.2%
9. Pork and Pork dishes 3.9%
10. White Fish coated and/or fried 3.9%

- The main source of protein in the Western world diet is of animal origin, followed by dairy, and scarcely from plant sources
- We are heavily reliant on animal sources of protein
- ‘Eat less meat but better’
- Alternative, sustainable sources of protein for farm (animal feed) to fork (human food) – role of plant proteins

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There is increasing concern that increased demand for animal products, associated with population growth, increased lifespan and improving economic prosperity in the developing world, will put unsustainable demands on the environment which may be further impacted on by climate change.

It therefore appears imperative that alternative husbandry techniques, including adoption of novel and more sustainable animal feeds should be combined with efforts to reduce meat consumption in more affluent parts of the world. By a combination of these interventions we may be able to maintain a sustainable level of meat and milk production.

How to embrace these changes as
A healthy and sustainable diet?

THE SIX LIVEWELL PRINCIPLES

• EAT MORE PLANTS Enjoy vegetables and wholegrains
• EAT A VARIETY OF FOODS Have a colourful plate
• WASTE LESS FOOD One third of food produced for human consumption is lost or wasted
• MODERATE YOUR MEAT CONSUMPTION, RED AND WHITE - Enjoy other sources of proteins such as peas, beans and nuts
• BUY FOOD THAT MEETS A CREDIBLE CERTIFIED STANDARD - Consider MSC, free-range and fair trade
• EAT FEWER FOOD HIGH IN FAT, SALT AND SUGAR - Keep food such as cakes, sweets and chocolate as well as cured meat, fries and crisps to an occasional treat. Choose water, avoid sugary drinks and remember that juices only count as one of your five a day, however much you drink.


https://www.wwf.org.uk/what-we-do/area-of-work/making-food-sustainable

Livewell Report 2011: a balance of healthy and sustainable food choices
**Shoppers prioritise health ahead of ethics and the environment**

- Given shoppers’ current priority of saving money, it is no surprise that price and promotions play the most significant role in product choice decisions.
- Quality ranks third and is often the gateway to thinking about sustainability issues.
- Shoppers are primarily focused on the direct benefit to both themselves and their families when choosing products, and health ranks above ethical considerations in most people’s shopping decision hierarchy.
- Nearly half of shoppers (49%) say healthy options are important when they are choosing which products to buy. This is significantly higher than those stating that ethical considerations are important (one in five).
- However, sustainability can play an important role when shoppers are choosing between products.

**Importance of differing factors in product choice**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Factor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Price</td>
<td>91%</td>
</tr>
<tr>
<td>2</td>
<td>Promotions</td>
<td>68%</td>
</tr>
<tr>
<td>3</td>
<td>Quality or performance</td>
<td>63%</td>
</tr>
<tr>
<td>4</td>
<td>Taste or smell</td>
<td>53%</td>
</tr>
<tr>
<td>5</td>
<td>Healthy option</td>
<td>49%</td>
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<tr>
<td>6</td>
<td>Use by or sell by date</td>
<td>47%</td>
</tr>
<tr>
<td>7</td>
<td>Familiarity</td>
<td>46%</td>
</tr>
<tr>
<td>8</td>
<td>Brand</td>
<td>35%</td>
</tr>
<tr>
<td>9</td>
<td>Ease of use</td>
<td>20%</td>
</tr>
<tr>
<td>10</td>
<td>Ethical or eco-friendly</td>
<td>19%</td>
</tr>
</tbody>
</table>

**Q. Rank your five most important considerations when shopping. Please think about the individual food and grocery products that you buy.**

*IGD ShopperVista July 2013, Base: all main grocery shoppers*
Key messages on challenges and opportunities for the food sector

Reformulation: reduction of meat protein and substitution of plant protein

New product development: to meet specific consumer sectors (demands)

Educating consumers about provenance

Is protein a functional food?
Functional foods deliver additional or enhanced benefits over and above their basic nutritional value (e.g. ageing population)

‘Breakfast like a king and dine like a pauper’ is not just a myth?
When we eat & what we eat influences health and wellbeing (chrono-nutrition)
By 2050 40% of the UK population will be over 50 (ONS)

- This is a public health challenge
- This is a market opportunity

‘Ageing well’ – is priority public health message (WHO)

- 50% of adults >80yr fail to meet the RDA for protein
- Failure to address this will have significant impact on public health
- Unmet need for this consumer - We are failing to address this need


Clear benefits to industry for effective reformulation & new product development

Cost
Palatability
Effectiveness
OUR RESEARCH QUESTION IS: How do we maintain a healthy protein intake in an ageing population?

OUR AIM IS: To develop and to disseminate a set of design rules for formulation of palatable higher-protein foods, for an ageing population

- Maintenance of good health across the life-course represents a key public health challenge
- Offsetting the declining intake of protein across mid and older age is essential to the maintenance of high musculoskeletal functioning
- The food industry could capitalise on a significant and growing market if adequate and empirical information could be collated to yield a roadmap / rule-set for new product formulation or re-formulation of existing products
This study highlights for the first time both the potency and challenges of tailoring protein enriched dishes to specific older consumers.


The older adults group is highly heterogeneous, and its members do not always meet their recommended protein intake.

Mealtime functionality as a basis for tailoring protein-enriched meal concepts to two senior consumer segments: The cosy meal concept was experienced as ‘traditional’ whereas the physical meal concept was perceived as ‘healthy’, ‘trendy’, and ‘energising’

This study highlights for the first time both the potency and challenges of tailoring protein enriched dishes to specific older consumers.

Satiety and weight control

- Increased protein intake during calorie deficit is beneficial for appetite control
- Around 30% protein, 30% fat and 40% carbohydrate from energy
- The amount of protein is more important than the type
Research impact to influence health and economy

This research is funded by The Scottish Government

Balanced for You - health food range with Marks & Spencer
Transfer of knowledge from science base to supermarket shelf
Effectiveness of high protein diets for appetite control and weight management
Balanced for you – 4 week data

Clinically relevant and statistically significant 5% weight loss over 4 weeks; total average weight loss is 4.73 kg (p<0.001)
Key messages: Red and processed meat consumption and purchasing behaviours and attitudes: impacts for human health, animal welfare and environmental sustainability

• Meat and dairy products represent energy and nutrient-dense sources of nutrition which, when consumed together with a range of fruit & vegetables, can provide a diet which is conducive to life-long health

• Excessive consumption, particularly of processed red meat, is associated with susceptibility to a range of chronic diseases, in particular CVD and colorectal cancer

• Women were significantly more likely to consume ≤ 1 portion of meat/d compared with men: women often household gatekeeper/shopper

• Females and older respondents (>60 years) were more likely to hold positive attitudes towards animal welfare: provenance important

• Less than a fifth (18·4 %) of UK consumers sample agreed that the impact of climate change could be reduced by consuming less meat, dairy products and eggs: more education required

• Positive attitudes towards animal welfare were associated with consuming less meat and a greater frequency of ‘higher welfare’ meat purchases

• Alternative, sustainable sources of protein for farm (animal feed) to fork (human food) – role of plant proteins

Eat less meat but better: quality not quantity

Implications for policy and practice: food chain approach

- Although UK dietary guidelines do advise a reduction in red and processed meat consumption, meat has become deeply entrenched in the UK diet and consideration needs to be given to social and cultural norms that need to undergo a massive shift to obtain the necessary reductions in consumption to facilitate environmental sustainability.

- The influence of the built and retail environment on meat purchasing decisions needs further research, to explore how retailers can edit choice at a food supply level, to simplify the situation for consumers wishing to purchase meat that is healthy and has been reared to high standards of animal welfare and environmental sustainability.

Future application of meat protein in food industry context

Working alongside the food/drinks industry, nutritionists, food scientists and food manufacturers can develop meals/foods/snacks high in protein to be effectively utilised as part of a healthy but sustainable diet.

EU Health claims for meat nutrients

1. Heart health
2. Normal vision
3. Growth & maintenance of muscle
4. Mental function, anti-fatigue
5. Immune function, natural antioxidants
6. Strong bones and teeth
7. Hormone regulation
8. Healthy skin, hair, nails

Based on EU Nutrition & Health Claims Regulations

http://www.nutrition-communications.co.uk
# Iron content of red meat

<table>
<thead>
<tr>
<th></th>
<th>mg per 100g as sold</th>
<th>Qualify for iron claim?</th>
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</thead>
<tbody>
<tr>
<td>Beef</td>
<td>2.1</td>
<td>Yes</td>
</tr>
<tr>
<td>Pork</td>
<td>0.7</td>
<td>No</td>
</tr>
<tr>
<td>Lamb</td>
<td>1.4</td>
<td>No</td>
</tr>
<tr>
<td>Veal</td>
<td>0.6</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>mg per 100g as consumed</th>
<th>Qualify for iron claim?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>2.3</td>
<td>Yes</td>
</tr>
<tr>
<td>Pork</td>
<td>1.3</td>
<td>No</td>
</tr>
<tr>
<td>Lamb</td>
<td>2.1</td>
<td>Yes</td>
</tr>
<tr>
<td>Veal</td>
<td>0.9</td>
<td>No</td>
</tr>
</tbody>
</table>

Surprisingly, red meat often does not qualify for a ‘source’ claim for iron due to the high water content but it is the most bioavailable source in the diet.

[http://www.nutrition-communications.co.uk](http://www.nutrition-communications.co.uk)
## Vitamin and mineral claims

<table>
<thead>
<tr>
<th>Source of …</th>
<th>Rich in …</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>Iron, potassium</td>
</tr>
<tr>
<td>Pork</td>
<td>Zinc, selenium, potassium</td>
</tr>
<tr>
<td>Lamb</td>
<td>Potassium</td>
</tr>
<tr>
<td>Veal</td>
<td>Vitamin D, zinc, potassium</td>
</tr>
<tr>
<td>Calf liver</td>
<td>Vitamin C, potassium</td>
</tr>
</tbody>
</table>

As per European regulations: EU (2008)
Few studies directly assess *apetite* in the elderly and how to deliver food to maximize nutrition and prevent sarcopenia (multi-nutritional strategy).

‘One diet approach’ does not fit all people - public health advice and food strategies need to be tailored for specific phenotypes to generate a sustainable & healthy approach for appetite control.

Identify barriers to acceptance (consumers/industry)

Research and innovation – reformulation for ‘health by stealth’ or substitution for ‘reformulation’

Preparation of protein isolates for food industry
Targeted marketing (evidence base)
Gluten free or free from growth
Lifestyle choice – target ageing population
Impact of our research

- Working with food industry
- Education
- Communicating science

Livewell: a balance of healthy and sustainable food choices

Everyday Super Food
James Oliver

Image of a book and people in a lab
Thank you – questions?

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