

## **Health Hazards of Meat & Mammalian Milk**

There is no scientific or moral justification for eating meat. Consequently, meat should be replaced with plant-based alternatives, for the following reasons.

### **Meat causes cancer**

In 2018, the International Agency for Research on Cancer and World Health Organisation declared **processed meat as carcinogenic** (Category 1A, alongside tobacco, chemotherapy, plutonium, etc) and red meat as probably carcinogenic to humans (Category 2A).<sup>1,2</sup> Processed meats are those transformed by cooking, salting, curing, smoking, etc and include sausages, bacon, ham, jerky, nuggets, patties, mince, etc.

Meta-analytical data from long-term studies shows that the consumption of meat is independently associated with a higher risk of:

- **Death from any cause**<sup>3,4</sup>
  - *Processed meat*: 100g/day (e.g. 2 slices of ham) = 50% higher risk (95% CI 20-80)
  - *Unprocessed meat*: 100g/day (e.g. 1 chicken leg) = 30% higher risk (95% CI 20-40)
  - 1.3million people; 9 studies from USA (5), Europe (3) and China (1); most studies adjusted for physical activity, alcohol, BMI and socioeconomic status.
- **Colorectal cancer**<sup>5,6</sup>
  - *Omnivore vs. Vegetarian*: 25% higher risk (95% CI 11-40%)
  - >1million people; 28 studies from the North & South America, Europe and Asia.
- **Pancreatic cancer**<sup>7</sup>
  - *Processed meat*: 50g/day (e.g. 1 slice of ham) = 19% higher risk (95% CI 4-36%)
  - 2.3million people in 13 studies from the USA (4), Europe (4) and Japan (1). All studies adjusted for age and smoking, most for energy intake, BMI and diabetes.
- **Gastric cancer**<sup>8</sup>
  - Processed meat: 30g/day (e.g. half a slice of ham) = 15% higher risk (95% CI 4-27%)
  - ~2million people in 10 studies from the USA (4), Europe (4) and Japan (2).
- **Prostate cancer**<sup>9</sup>
  - Processed meat: ½ serving per week = 40% higher risk of fatality (95% CI 81-244%)

- **Breast cancer**<sup>10,11</sup>
  - Processed meat: 25g/day (e.g. half a slice of ham) = 9% higher risk (95% CI 3-16%)
  - 1.3million women in 13 studies from the Americas, Europe and Asia.
- **Nasopharyngeal cancer**<sup>12</sup>
  - Processed meat consumption weekly approximately doubled the odds of cancer

### **Meat causes cardiovascular disease**

Atherosclerosis is principally caused by the deposition of cholesterol filled low-density lipoprotein (LDL) in blood vessel walls. Meat contains saturated fats which drives the production of endogenous cholesterol, alongside **absorbed exogenous cholesterol which is only found in animal products**.

Meta-analytical data shows that the consumption of meat independently increases the risk of:

- **Type 2 diabetes mellitus**<sup>13–18</sup>
  - Per 5% of energy from animal-protein = 12% higher risk (95% CI 8-17%)
  - 100g/day (2 slices of ham) = 17% higher risk (95% CI 8-26%)
  - 2 rashers of bacon per day = 200% higher risk (95% CI 40-300%)
  - 1 hot dog per day = 92% higher risk (95% CI 33-278%)
- **Hyperlipaemia**<sup>19</sup>
  - 1 portion of red or white meat daily for 1 week<sup>20</sup> increases total cholesterol 4% (0.2 mmol/L) and LDL 6% (0.16 mmol/L)
- **Ischaemic heart disease**<sup>1,21</sup>
  - A meat-free diet reduces the risk of ischaemic heart disease by 25% (RR 0.75 [95% CI 0.68, 0.82])<sup>1</sup>
  - A meat-free diet reduces the risk of recurrent (repeated) myocardial infarction by 28% (RR 0.28 [95% CI 0.15, 0.52])<sup>21</sup>
- **Non-alcoholic fatty liver disease**<sup>22</sup>
  - A diet including red meat increased the risk of NAFLD by 12% (95% CI 2, 29)
- **Obesity**<sup>23,24</sup>
- **Ischaemic stroke**<sup>25</sup>

- **Peripheral vascular disease**<sup>26</sup>
- **Hypertension**<sup>25</sup>

### Other diseases

Long-term cohort studies also show that the consumption of meat is independently associated with a higher risk of: **worse glycaemic control in diabetic patients**<sup>15,16</sup>, **heart failure**<sup>1,27</sup>, **respiratory disease**<sup>28,29</sup>, **chronic kidney disease**<sup>28</sup>, **liver disease**<sup>28</sup>, **depression**<sup>30</sup>, **gallstones**<sup>31</sup>, **diverticulosis**<sup>32</sup> and **gout**<sup>33</sup>.

### Food Poisoning

In 2018, the UK Food Standards Agency Annual reported **1 million cases of food poisoning**, which resulted in 20,000 hospital admissions and 500 deaths, costing £1billion; **86% derived from eating meat**.

### Epidemics & pandemics

In 2018, the World Health Organisation reported that >60% of infectious disease in humans originate in animals<sup>34</sup>. Such infections occur as a direct results of animal agriculture. Resultant pandemics include:

Pathogen	Year	Country of origin	No. infected	Fatality %
SARS-CoV2 (COVID-19)	2019	China	>20million	~2
H7N2, H5N1, H5N6, H5N8 Bird Flus	1997 onwards	Multinational	861	53
H1N1 Swine Flu	2009	USA	~1million	<0.01
MARBURG	1967	Uganda	590	81
SARS	2002	China	8098	10
EBOLA	1976	DRC	33,687	44
NIPAH	1999	Malaysia	496	53
MERS	2012	Saudi Arabia	2494	35
Season influenza	Annual	Global	~1billion	<0.01

UK epidemics due to animal farming include:

Pathogen	Vector	Year(s)	No. infected	Fatality %
Bovine TB	Cows and badgers	2017	3816	5
Campylobacter	Poultry	Annual	>1.5million	1

Hand foot and mouth	Cows	2001	1.6million	<0.01
Bubonic plague	Numerous animals	1890s to 1990s	Millions	15%

### **Animal Agriculture and Antimicrobial Resistance**

Approximately **70% of the world's antibiotics are consumed by animals destined for slaughter**<sup>35,36</sup>.

Antimicrobial resistance is a critical and potentially catastrophic problem for humans. Therefore, the consumption of meat must be reduced – or better still, eliminated – to tackle antimicrobial resistance.<sup>37</sup>

### **Dairy causes disease**

Dairy products (milk, cheese, yoghurt, etc) are rich in saturated fats and cholesterol, and both are fundamental to the development of atheroma (i.e. atherosclerosis). Eating dairy has several other important detrimental effects on health:

1. **Cow Milk protein intolerance** – 68% of humans worldwide are lactose-intolerant<sup>38</sup>
2. **Type 1 diabetes** – there is emerging evidence that cow milk protein exposure in infancy increases the risk of Type 1 Diabetes Mellitus<sup>39</sup>.
3. **Mammalian hormones** – Oestrogen-driven cancers such as prostate cancer<sup>40</sup> are associated with dairy consumption.

### **Myths about being Vegan**

- **B<sub>12</sub> deficiency** – cobalamin is synthesised by bacteria; it is abundant in animal tissues (e.g. meat) and secretions (e.g. milk) because the grains fed to livestock are supplemented with B12. Since many other household foods are also fortified with B12 (e.g. breads, cereals, milks, etc) deficiency is not reported in modern times. A recent systemic review and meta-analysis showed that vegans had a B12 intake which was 247% of the NRV, compared to omnivores at 329%.<sup>41</sup> There is no robust evidence to suggest vegans/vegetarians have a higher incidence of B12 deficiency, or a higher risk of any neurological/ haematological sequelae from cobalamin deficiency than omnivores.
- **Iron deficiency** – Haider & colleagues<sup>42</sup> showed that whilst omnivores had a higher mean serum ferritin (30 µg/L [95% CI 38, 86]), vegetarians were not iron deficient or at risk of iron deficiency anaemia. Moreover, having excess iron stores (as occurs with an omnivorous diet) is associated with a higher risk of Type 2 Diabetes<sup>43</sup>.

- **Zinc deficiency** - A review by Foster et al (2013)<sup>44</sup> shows whilst that omnivores have a 1mol/L higher mean serum concentration of zinc than vegetarians, this does not constitute deficiency.
- **Selenium/Iodine deficiency** – there is no robust evidence to suggest that diet is associated with deficiency of selenium or iodine in the western world. Livestock foods (grains) have been fortified with selenium since 1978 in the UK to prevent financial losses from animal disease/death.
- **Protein deficiency** – it is impossible to be protein deficient without being calorie deficient. There is no evidence to show that vegetarians or vegans are protein deficient<sup>45</sup>. To the contrary, numerous notable athletes e.g. Patrik Baboumian who holds several power lifting world titles and was Germany's Strongest Man, Novak Djokovic the 16-time International Tennis Champion and David Hay the World Heavyweight Boxing Champion, are all vegan (to name a few).
- **Soya products** – numerous studies have shown that consumption of soya products (instead of meat) reduces all-cause mortality<sup>46</sup> and specifically, the risk of cancer of the breast<sup>47</sup>, prostate<sup>48</sup> and colorectum<sup>49</sup> with no other measurable effect on any major disease or outcomes<sup>50</sup>. Soy products have no in-vitro effects on hormone profiles, anthropomorphic measurements or otherwise.
- **Calcium & bone health** – there is no association between the consumption of dairy products (milk, yoghurt or cheese) and the 'strength' of bones
  - **Calcium / Bone Mineral Density** – Tai and colleagues (meta-analysis of 51 studies, 13,890 people)<sup>51</sup> showed that the amount of calcium intake, in the form of dairy foods or supplements, was not associated with bone mineral density.
  - **Fracture risk** – numerous studies<sup>52,53</sup> have shown that the amount of dietary Vitamin D has no association with the risk of fracture.
- **Growth** – several studies show no differences in the anthropometrics of children or adolescents of omnivorous, vegetarian and vegan diets<sup>45,54</sup>. Even if there were a difference, it would beg the question whether omnivorous children were artificially taller, given the prevalence of natural and recombinant bovine somatotrophin (growth hormone) and insulin-like-growth factors found in cow's milk.

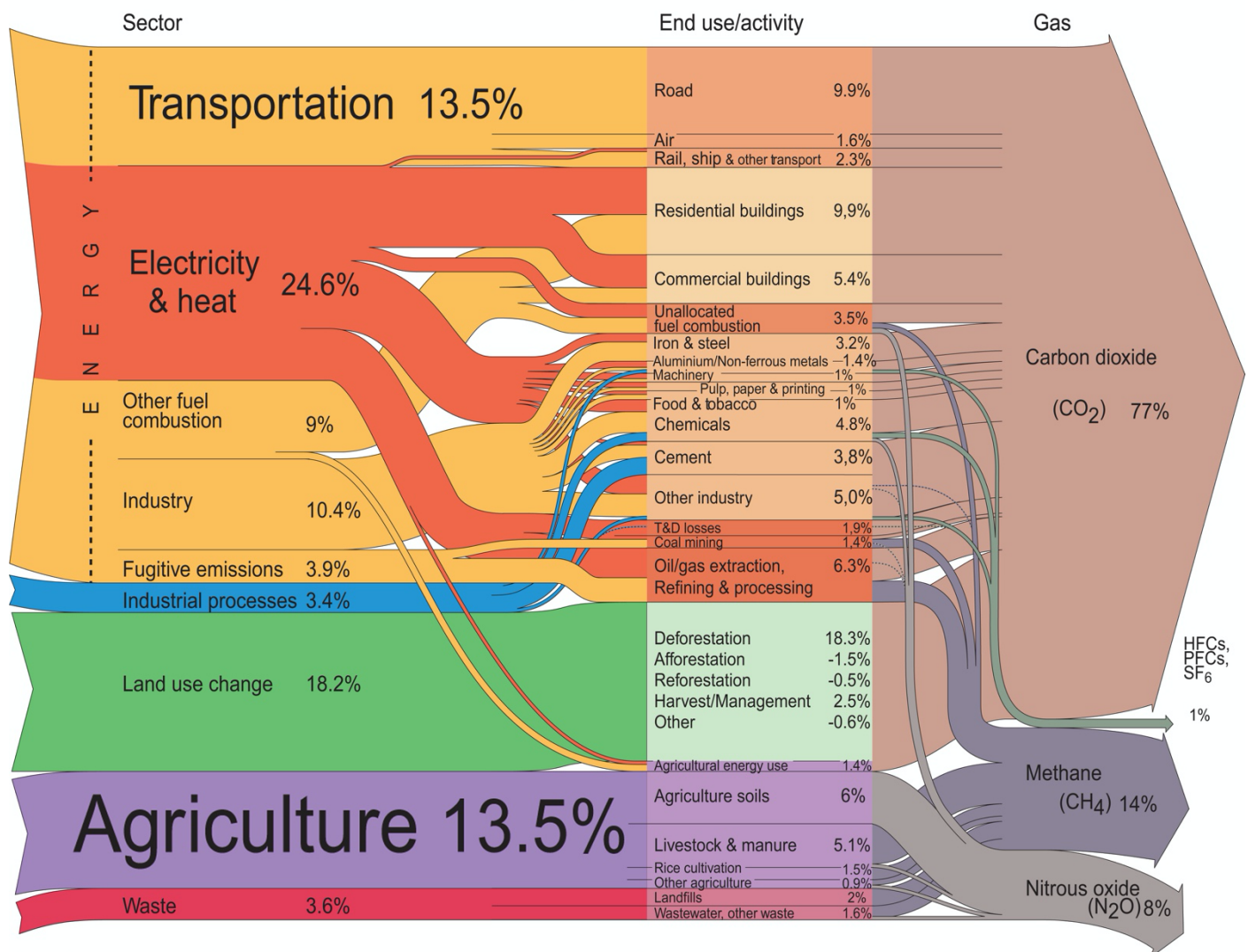
### Comparison of plant and dairy milks (per litre)

Characteristics		Soya milk	Oat milk	Dairy (bovine) milk		
				Skimmed	Semi	Full
Nutritional content	Energy (kcal)	336	450	240	470	650
	Protein (g)	34	10	36	36	35
	Fat (g)	19.2	15	3	18	37
	Saturated fat (g)	3.2	2	6	13	19
	Cholesterol (mg)	0	0	50	80	100
	Sugars (g)	1.2	35	5	5	5
	Salt (g)	0.8	1	4.4	4.7	4.3
	Fibre	8	8	0	0	0
	Vitamin D	8	1.5	0.3	0.3	1.3
	Vitamin B2	2	2.1	2	2	2
	Vitamin B12	4	3.8	8	9	9
	Vitamin B5	5	/	5	7	6
	Calcium (g)	1.2	1.2	1.3	1.2	1.2
Resources used <sup>55</sup>	CO <sub>2</sub> (kg)	0.4	0.9	3.2		
	Land (m <sup>2</sup> )	0.7	0.8	9		
	Water (L)	28	48	628		
Antibiotic residue (µg/L) <sup>56</sup>	Penicillins	0	0	12		
	Tetracyclines	0	0	500		
	Macrolides	0	0	40		
	Aminoglycosides	0	0	2000		
	Colistin	0	0	20		
Hormones (ng/ml) <sup>57</sup>	Progesterone	0	0	9.81		
	17β-estradiol	0	0	0.02		
	Oestrogen	0	0	0.13		
Price		85p	£1	80p		

## Climate Change

The livestock sector is the leading cause of climate change worldwide, responsible for >14% of all greenhouse gas (GHG) emissions<sup>58</sup>. If longer-term models are considered (given that methane decays to CO<sub>2</sub> and livestock populations are increasing), the livestock sector is responsible for up to 51% of GHGs<sup>59</sup>. The Intergovernmental Panel on Climate Change and United Nations Special Report 2019 states that humans must embrace a plant-based diet to mitigate catastrophic effects of a warming climate.

### World greenhouse gas emissions by sector

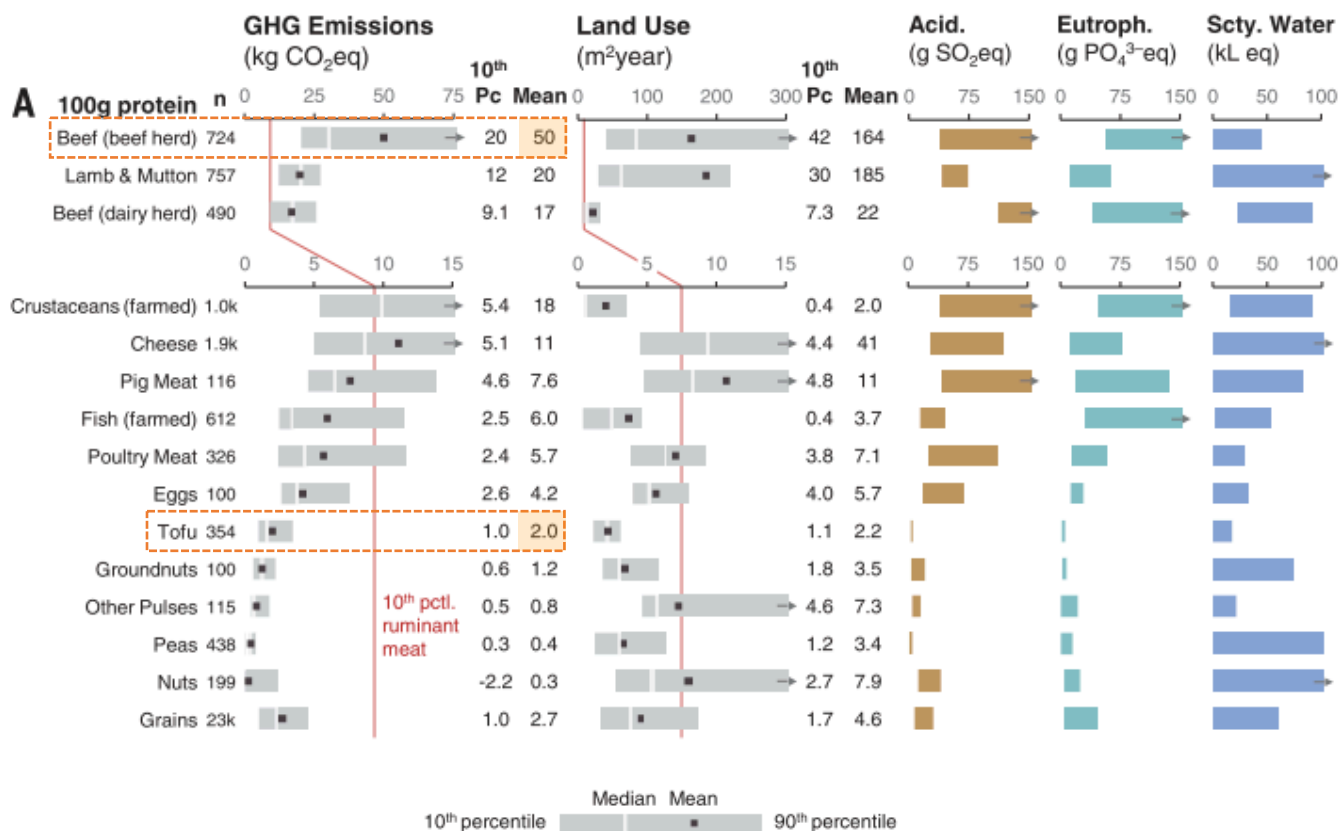


All data is for 2000. All calculations are based on CO<sub>2</sub> equivalents, using 100-year global warming potentials from the IPCC (1996), based on a total global estimate of 41 755 MtCO<sub>2</sub> equivalent. Land use change includes both emissions and absorptions. Dotted lines represent flows of less than 0.1% percent of total GHG emissions.

Source: World Resources Institute, Climate Analysis Indicator Tool (CAIT), Navigating the Numbers: Greenhouse Gas Data and International Climate Policy, December 2005; Intergovernmental Panel on Climate Change, 1996 (data for 2000).



Compared to a plant-based protein sources (e.g. soya), beef farming produces >25 times the GHG emissions and requires 80 times more land<sup>55</sup>.



## Starvation

**Worldwide famine could be solved** if humans stopped eating meat.<sup>60</sup> An omnivorous diet requires at least 17 times more land, 14 times more water and 10 times more energy than a vegetarian diet because livestock are supplemented with grains which could instead feed at least 5 billion humans. For example, >85% of the global crop of soybeans are fed directly to animals who are farmed for their milk and eventually slaughtered for their body parts<sup>61</sup>. And, fewer than 10% of these calories are transferred to milk and meat which represents substantial waste. Therefore, if the grains destined for livestock were instead fed directly to humans, world hunger would end.

## Assessment

There is no moral or scientific justification for consuming meat & dairy. **By embracing a plant-based diet, individuals can reduce their carbon footprint by up to 73%<sup>55</sup> whilst improving their overall health. The British and American Dietetic Associations have declared a vegan/vegetarian diet as safe and suitable for**



**all stages of life including pregnancy and childhood.** Therefore, meat & dairy should be replaced with plant-based alternatives.

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