Meat and dairy product consumption and cancer risk

EAAP Belfast 31 August 2016

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1 out of 3 in high income countries
Global cancer incidence in 2012

14.1 million new patients per year in the world
1/3 of the most common types of cancer can be prevented by more physical activity and eating healthier.
Recommendations for cancer prevention

10 CANCER PREVENTION RECOMMENDATIONS

- Maintain a healthy weight
- Move more
- Eat well
- Enjoy a plant-based diet
- Reduce red meat, avoid processed meat
- Cut down on alcohol
- Eat less salt
- After treatment, cancer survivors should follow the cancer prevention recommendations
- If you can, breastfeed your baby
- For cancer prevention, don't use supplements
- And always remember - do not smoke or chew tobacco.

For quality of life
Who stays...?

✓ Smoking: no!
✓ Physical activity: 30 minutes per day or more
✓ Red meat: less than 5x per week (incl. processed meat)
✓ Weight: BMI < 25, little belly fat
✓ Alcohol: less than 1 or 2 glasses per day
✓ Fruit: 2x per day or more
✓ Vegetables: 2 vegetables spoons per day or more
✓ Dietary supplement to prevent cancer: no
How do we know what is causing/preventing cancer?

Valid and sufficient scientific evidence
Analytical epidemiology: Cohort study

High intake of red and processed meat → Colorectal cancer

Low intake of red and processed meat → No colorectal cancer

Follow-up time (years)
Systematic literature review and meta-analyses

- animal and in-vitro studies
- 10,000 epidemiological studies
- 9 international centres

http://www.wcrf.org/cancer_research/cup/
Grading the evidence

- Convincing
- Probable

- Limited Evidence – Suggestive
- Limited Evidence – No Conclusion

- Substantial Effect on Risk Unlikely

Basis for recommendations
Grading the evidence   **Convincing**

- Strong and unlikely to change in future
- No unexplained heterogeneity
- At least 2 independent cohort studies
- Good quality studies that account for error
- Dose response
- Robust evidence from laboratory studies
Grading the evidence *Probable*

- No unexplained heterogeneity
- At least 2 independent cohort or 5 case-control studies
- Good quality studies that account for error
- Dose response
- Plausible evidence from laboratory studies

[World Cancer Research Fund International logo]
Recommendations for cancer prevention

No recommendation on dairy
Meat products and cancer

Red meat: beef, pork, lamb, and goat from domesticated animals including that contained in processed foods

Processed meat: meat preserved by smoking, curing or salting, or addition of chemical preservatives, including that contained in processed foods
Per 100 grams of red meat the relative risk increases with 17%
Processed meat and colorectal cancer per 50g/day

Per 50 gram processed meat the relative risk increases with 18%

WCRF/AICR CUP 2011; Chan et al, PlosOne 2011
What is the underlying mechanism?
## Food, nutrition, physical activity & cancer

### 2011

<table>
<thead>
<tr>
<th>Decreases Risk</th>
<th>Increases Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Convincing</strong></td>
<td><strong>Red meat</strong></td>
</tr>
<tr>
<td>Physical activity</td>
<td>Processed meat</td>
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<tr>
<td>Foods containing dietary fibre</td>
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<tr>
<td><strong>Probable</strong></td>
<td>Alcoholic drinks (men)</td>
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<tr>
<td>Garlic</td>
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<tr>
<td>Milk</td>
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<tr>
<td>Calcium</td>
<td></td>
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<tr>
<td><strong>Limited - suggestive</strong></td>
<td>Foods containing iron</td>
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<tr>
<td>Non-starchy vegetables</td>
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<tr>
<td>Fruits</td>
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<tr>
<td>Foods containing vitamin D</td>
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<tr>
<td>Cheese</td>
<td></td>
</tr>
<tr>
<td><strong>Limited - no conclusion</strong></td>
<td>Foods containing animal fats</td>
</tr>
<tr>
<td>Fish; glycaemic index; folate; vitamin C; vitamin E; selenium; low fat; dietary pattern</td>
<td></td>
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<tr>
<td><strong>Substantial effect on risk unlikely</strong></td>
<td>None identified</td>
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</table>

### 2016

<table>
<thead>
<tr>
<th>Decreases Risk</th>
<th>Increases Risk</th>
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<tbody>
<tr>
<td><strong>Convincing</strong></td>
<td><strong>Processed meat (non-cardia)</strong></td>
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<tr>
<td>Body fatness (cardia)</td>
<td></td>
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<tr>
<td>Alcohol fatness</td>
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<tr>
<td>Foods preserved by salting</td>
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<tr>
<td><strong>Probable</strong></td>
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<tr>
<td>Citrus fruit (cardia)</td>
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<tr>
<td>Grilled (broiled) or barbecued (charbroiled) meat and fish</td>
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<tr>
<td>Low fruit intake</td>
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<tr>
<td><strong>Limited - suggestive</strong></td>
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<tr>
<td>Cereals (grains) and their products; dietary fibre; vegetables; pulses (legumes); potatoes; starch rich tubers and plantains; citrus fruit (non-cardia); nuts and seeds; herbs, chilli; spices and condiments; meat (un processed); processed meat (cardia); poultry; fish (un processed); eggs; milk and dairy products; total salt; added salt; fruit juices; coffee; tea; green tea; frying; drying or dried food; dietary nitrate and nitrite; Nitratoxidamines; metals; fats and oils; total fat; fatty acid composition; cholesterol; sugars; beta-carotene; retinol; thiamin; riboflavin; vitamin C; vitamin D; multivitamin mineral supplements; calcium; iron; selenium; body fatness (non-cardia); physical activity; sedentary behaviour; adult attained height; energy intake</td>
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<tr>
<td><strong>Limited - no conclusion</strong></td>
<td></td>
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<tr>
<td><strong>Strong evidence</strong></td>
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In the media: October last year...

Processed and red meat: what are the cancer risks?

The following Q&A was produced by the World Health Organisation’s International Agency for Research on Cancer

Processed meats do cause cancer - WHO

By James Gallagher
Health editor, BBC News website

© 28 October 2015 | Health

Processed meat like bacon linked to cancer, red meat deemed risky too: WHO

By Kerry Burke, Nancy Dillon, Reuven Blau / NEW YORK DAILY NEWS /

Update: Tuesday, November 3, 2015, 13:16 AM
WHO/IARC report 2015

Red meat was classified as **probably carcinogenic to humans (Group 2A)**, based on **limited evidence** that the consumption of red meat causes cancer in humans and **strong mechanistic evidence** supporting a carcinogenic effect. This association was observed mainly for colorectal cancer, but associations were also seen for pancreatic cancer and prostate cancer.
What does it mean?

Per 100 grams of red meat the relative risk increases with 17%.

50 out of 1000 individuals in UK get colorectal cancer.

Risk: 5%

Per 100 grams of red meat per day more increases this risk from 5 to 5.8%.
Red and processed meat versus smoking

The evidence is equally strong, but the risk of cancer is far higher with smoking!
Recommendations for cancer prevention

People who eat red meat to consume less than 500 g (18 oz) a week, very little if any to be processed.
Dairy and cancer
In the media...

Milk: Good for Calves, Bad for...

Got Milk? NO THANKS!
Milk has been linked to bone fractures, certain types of cancer, cardiovascular disease, and other health problems.

PhysiciansCommittee

Milk does. The number one cancer promoting hormone is triggered in the human body by all cow milk. Regardless of whether or not it's organic, free-range, or even 'hormone free'.

www.ejnet.org/bgh/nogood.html

Play hardball against prostate cancer

YER OUT!

Eliminate milk — help prevent prostate cancer.
Studies show dairy increases prostate cancer risk.

PhysiciansCommittee

September is Prostate Cancer Awareness Month

WAGENINGEN UR
For quality of life
Total dairy and colorectal cancer – per 400 g/day

Per 400 grams of dairy the relative risk decreases with 15%
Dairy and colorectal cancer: potential mechanisms

Calcium (and vitamin D):

- Binding of bile acids, free fatty acids
- Direct influence by restraining cellular proliferation
- Promotes differentiation and apoptosis

Fermented dairy:
- Favourable effect on colorectal mucosa?

Other?
- Vitamin B2: DNA-methylation
### Food, nutrition, physical activity & colorectal cancer

#### FOOD, NUTRITION, PHYSICAL ACTIVITY AND CANCERS OF THE COLON AND THE RECTUM 2011

<table>
<thead>
<tr>
<th></th>
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<tr>
<td><strong>Convincing</strong></td>
<td>Physical activity&lt;sup&gt;1,2&lt;/sup&gt;</td>
<td>Red meat&lt;sup&gt;4,5&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Foods containing dietary fibre&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Processed meat&lt;sup&gt;4,6&lt;/sup&gt;</td>
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<tr>
<td></td>
<td></td>
<td>Alcoholic drinks (men)&lt;sup&gt;7&lt;/sup&gt;</td>
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<td></td>
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<td>Body fatness</td>
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<td></td>
<td>Abdominal fatness</td>
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<td></td>
<td>Adult attained height&lt;sup&gt;8&lt;/sup&gt;</td>
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<tr>
<td><strong>Probable</strong></td>
<td>Carrots</td>
<td>Alcoholic drinks (women)&lt;sup&gt;7&lt;/sup&gt;</td>
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<td></td>
<td>Milk&lt;sup&gt;9&lt;/sup&gt;</td>
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<td>Non-starchy vegetables</td>
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<td>Cheese&lt;sup&gt;11&lt;/sup&gt;</td>
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For quality of life

WCRF/AICR CUP 2011
Dairy and prostate cancer

Increased risk of prostate cancer with high intakes of:
- Total dairy products
- Cheese
- Low-fat milk and skim milk combined
- Total calcium
- Dietary calcium
- Dairy calcium

Decreased risk with high intakes of:
- Whole milk

No association with high intakes of:
- Skim milk
- Ice cream
- Butter
Dairy and type of prostate cancer

nonadvanced
Song 2013
Kurahashi 2008
Ahn 2007
Neuhouser 2007
Park 2007
Park 2007
Park 2007
Rohrmann 2007
Severi 2006
Subtotal (I-squared = 53.0%, p = 0.037)

advanced
Song 2013
Kurahashi 2008
Ahn 2007
Neuhouser 2007
Park 2007
Park 2007
Park 2007
Rohrmann 2007
Giovannucci 2006
Severi 2006
Rodriguez 2003
Subtotal (I-squared = 0.0%, p = 0.712)
Dairy products and prostate cancer

<table>
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<tr>
<td>Body fatness (advanced prostate cancer)^1,2</td>
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<tr>
<td>Adult attained height^3</td>
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<td>Dairy products</td>
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<tr>
<td>Diets high in calcium</td>
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<tr>
<td>Low plasma alpha-tocopherol concentrations</td>
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<td>Low plasma selenium concentrations</td>
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<td><strong>LIMITED-no conclusion</strong></td>
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<tr>
<td>Cereals (grains) and their products, dietary fibre,</td>
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<tr>
<td>potatoes, non-starchy vegetables, fruits, pulses</td>
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<tr>
<td>(legumes), processed meat, red meat, poultry, fish,</td>
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<tr>
<td>eggs, total fat, saturated fatty acids, monounsaturated fatty acids, polyunsaturated fatty acids, plant oils, sugar (sucrose), sugary foods and drinks, coffee, tea, alcoholic drinks, carbohydrate, protein, vitamin A, retinol, alpha carotene, lycopene, folate, thiamin, riboflavin, niacin, vitamin C, vitamin D, vitamin E supplements, gamma-tocopherol, multivitamins, selenium supplements, iron, phosphorus, calcium supplements, zinc, physical activity, energy expenditure, vegetarian diets, Seventh-day Adventist diets, individual dietary patterns, body fatness (non-advanced prostate cancer), birth weight, energy intake</td>
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<td>Beta-carotene^4,5</td>
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Dairy and other types of cancer
No recommendation on dairy products
Thus... Enjoy dairy and red meat...

By keeping to the recommended quantities