THE ROLE OF MILK PRODUCTS IN HUMAN HEALTH

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Dairy products and health: what are we trying to do?

Mechanisms?
PROBLEMS IN THE YOUNG
Dairy food intake in UK females

NDNS 2014, Y1-4 combined

Age range

Intake (g/d)

Milk
Cheese
Yoghurt

4-10
11-18
19-64
Micronutrient status of UK children and adult females

% < LRNI

- Fe
- Ca
- Mg
- Zn
- Se
- I

Females 11-18y
Females 19-64y
Males 11-18y
Bone mass changes with age

Weaver et al. (2016)
Calcium status of Spanish children at ~7 years old

Rubio-López et al., 2017

Ca inadequate
Girls 29%
Boys 22%

Adequate Ca
1081 mg/d

Inadequate Ca
649 mg/d
Childhood milk intake and fracture risk in females $\geq 50$ years

Kalkwarf et al., 2003

Relative risk of osteoporotic fractures

- $>1$/day
- 1/day
- 1-6/week
- $<1$/w

$P_{\text{trend}} = 0.04$
Bonetrophic nutrient interactions
Protein for bones?

Nutritional information for the almond milk:

- Fat: 1.1g
- Carbohydrate: 1.3g
- Protein: 0.4g
- Fibre: 0.4g
- Of which sugars: 0.1g

The nutritional values per 100ml are:

- Energy: 73kJ (18kcal)
- Fat: 1.1g
- Carbohydrate: 1.3g
- Of which sugars: 0.1g
- Protein: 0.4g
- Fibre: 0.4g
- Calcium: 120.0mg (15% NRV)
Sub-optimal vitamin D status across Europe

UK childhood rickets
Recent studies of UK iodine status

Recent UK studies have shown sub-optimal status in:

- Women of childbearing age¹-³
- Pregnant women⁴-⁷

Milk intake and 24 h iodine excretion

Bath et al. (2013)
Type of UK retail milk and iodine content

4 supermarkets (P<0.001)
2 regions (NS)
6 months 2015 (P<0.001)
3 types (P<0.001)

Stevenson et al. (under review)
Two other issues related to iodine

<table>
<thead>
<tr>
<th></th>
<th>UK RNI (µg/d)</th>
<th>140</th>
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<tbody>
<tr>
<td>WHO RNI</td>
<td>150</td>
<td></td>
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140

250

[Chemical structures and text not transcribed]
Sucrose-sweetened beverages increase fat storage in liver, muscle and visceral fat
MIDDLE AND OLDER AGE
## Recent meta-analyses of prospective studies on dairy and cardiometabolic diseases

<table>
<thead>
<tr>
<th>Dairy</th>
<th>Outcome</th>
<th>RR (95% CI)</th>
<th>Ref</th>
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<tbody>
<tr>
<td>Milk</td>
<td>AC mortality</td>
<td>1.00 (0.93-1.07)</td>
<td>Guo et al., 2017</td>
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<tr>
<td>Milk</td>
<td>CVD</td>
<td>1.01 (0.93-1.10)</td>
<td>Guo et al., 2017</td>
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<tr>
<td>Cheese</td>
<td>CVD</td>
<td><strong>0.98</strong> (0.95-1.00)</td>
<td>Guo et al., 2017</td>
</tr>
<tr>
<td>Milk</td>
<td>Stroke</td>
<td><strong>0.93</strong> (0.88-0.98)</td>
<td>De Goede et al., 2016</td>
</tr>
<tr>
<td>Cheese /40 g/d</td>
<td>Stroke</td>
<td>0.97 (0.94-1.01)</td>
<td>De Goede et al., 2016</td>
</tr>
<tr>
<td>Yoghurt/80g/d</td>
<td>Diabetes</td>
<td><strong>0.86</strong> (0.83-0.90)</td>
<td>Gijsbers et al., 2016</td>
</tr>
</tbody>
</table>
What about saturated fats and CVD?

For most people dairy foods are the biggest source of SFA (just!)
Peripheral SBP & DBP

Overall treatment effect for C_SBP p=0.010,
Overall treatment effect for C_DP p=0.094,
Overall treatment effect for C_MeanP p=0.024

n=38, Means ± SEM

Central SBP & DBP

Overall treatment effect for C_SBP p=0.010,
Overall treatment effect for C_DP p=0.094,
Overall treatment effect for C_MeanP p=0.024

n=38, Means ± SEM

Fekete et al., AJCN (2016)
Milk proteins and blood lipids

Δ baseline (mmol/L)

-0.2 -0.15 -0.1 -0.05 0 0.05 0.1

TC  LDL-C  TAG

Whey protein  Ca-caseinate  Control

a  a  a

b  ab  b

a,b different =P<0.05

Fekete et al., AJCN (2016)
Changes in total and LDL-chol after consumption of ~80 g/d fat (~36g/d SFA) as cheese or butter

Replacing saturated fat in milk fat

Ca soap (CS) of oleic acid study

Kliem et al., JDS 2013
Fasting blood cholesterol

Markey et al. (under review)

Also a trend for a beneficial reduction in markers of insulin resistance
A few conclusions...

- Milk/dairy foods are key sources of important nutrients
- Composition can be influenced by primary production
- Declines in consumption esp. young females have already had consequences......
- Risk of poor bone development especially in girls is concerning and may become a major issue
- Functionality of some dairy foods beyond nutrient supply
- No evidence of increased risk of CVD from high dairy consumption despite SFA
- Negative association of milk proteins and milk/fermented dairy and BP and T2DM may become the most important findings but needs development.
- Dietary pattern, nutrition and health must be included in any debate about sustainable food production