One of the most negative aspects of whole cow’s milk consumption in infancy is the probability of iron deficiency. Cow’s milk and human milk are both low in iron, but the bioavailability of iron from human milk is more favorable for the infant’s intestines than iron from cow’s milk. Cow’s milk has much higher calcium content, and the protein type and content in cow’s milk negatively influence iron absorption from food. Cow’s milk proteins are also believed to induce blood loss through feces.

A high prevalence of iron deficiency among 12-month-olds was seen in an Icelandic study in 1995–1997; the independent negative association was with high consumption of whole cow’s milk or above 460 g/day. Association between iron deficiency and whole cow’s milk consumption was also evident at 2 years of age. Furthermore, a worse fine motor development scores at 6 years of age were independently associated with iron deficiency at younger age (fig. 1) [1]. Following this study, the recommendations for infant nutrition were modified, and Icelandic iron-fortified and protein-reduced follow-on milk (table 1) was recommended from 6 months to 2 years of age instead of unmodified cow’s milk. This led to a shift in milk consumption. Icelandic follow-on milk has now largely replaced the use of unmodified whole cow’s milk. This is assumed to be one of the main reasons for improvements in iron status among the 12-month-old children: 1.4% are now iron deficient vs. 20% in the 1990s [3].

High protein content of whole cow’s milk is by some authors regarded as a second major concern for early cow’s milk consumption. It is suggested that it stimulates rapid growth in bodyweight and the development of overweight. High protein intake early in life has been associated with higher body mass index later in childhood. According to the results of the recent Icelandic study on infant nutrition, the protein intake has decreased over the past 10 years. However, the protein intake was still positively related to weight growth velocity. A large European study, European Childhood Obesity Project, indicated that
lowering protein content of infant formula could have an important potential for long-term health promotion and prevention of obesity [4]. Additionally, whole cow's milk protein has been shown to have other various negative effects on infants' health. Cow's milk protein has been

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Fig. 1. Iron status vs. development at 6 years. Children, iron-deficient (ID) and with depleted iron stores (DIS) at 1 year had lower scores on fine motor development test. The Icelandic developmental inventory evaluates children’s motor and verbal development by collecting answers to 208 standardized questions from their mothers [2].

Table 1. Nutrient content of Icelandic follow-on milk, unmodified cow’s milk and the minimum and maximum values allowed for follow-on milk composition according to Icelandic Regulation No. 735/1997 regarding follow-on milk

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Icelandic follow-on milk</th>
<th>Whole milk</th>
<th>Min. for follow-on milk</th>
<th>Max. for follow-on milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy, kJ (kcal)</td>
<td>280 (67)</td>
<td>280 (67)</td>
<td>251 (60)</td>
<td>335 (80)</td>
</tr>
<tr>
<td>Protein, g</td>
<td>1.8</td>
<td>3.4</td>
<td>1.35</td>
<td>3.6</td>
</tr>
<tr>
<td>Carbohydrates, g</td>
<td>7.2</td>
<td>4.5</td>
<td>4.2</td>
<td>11.2</td>
</tr>
<tr>
<td>Fat, g</td>
<td>3.5</td>
<td>3.9</td>
<td>1.98</td>
<td>5.2</td>
</tr>
<tr>
<td>Iron, mg</td>
<td>0.75</td>
<td>–</td>
<td>0.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Calcium, mg</td>
<td>90</td>
<td>114</td>
<td>47.25</td>
<td>126</td>
</tr>
<tr>
<td>Vitamin C, mg</td>
<td>9</td>
<td>–</td>
<td>4.8</td>
<td>–</td>
</tr>
<tr>
<td>Vitamin D, µg</td>
<td>1.2</td>
<td>–</td>
<td>0.6</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Values are shown as a portion of 100 g.
shown to be a significant etiological factor for constipation in high
doses but also in lower doses in allergic infants and young children. It
has also been shown to have a negative impact on water balance dur-
ding febrile illness through its high potential renal solute load.

Some studies have found a statistical association between type 1
diabetes and early introduction of cow’s milk [5]. Ecological studies
have linked β-casomorphins derived from β-casein A1 and B with type
1 diabetes. A link between β-casomorphins and disorders of the cen-
tral nervous system, such as autism, ventilation disorders and sudden
infant death syndrome, has also been suggested in the literature. How-
ever, the evidence linking cow’s milk to diabetes and these serious ill-
nesses is weak and should not be regarded as a public health concern.
Well-established evidence-based guidance should be promoted and
every possible research stimulated to increase the value of infant nutri-
tion recommendations. A recent review described the determinants
for early timing of cow’s milk introduction, i.e. low maternal education
and socioeconomic status, and not following the main guidelines for
infant nutrition [6], indicating that research to increase the probability
of compliance with the recommendations is needed.

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