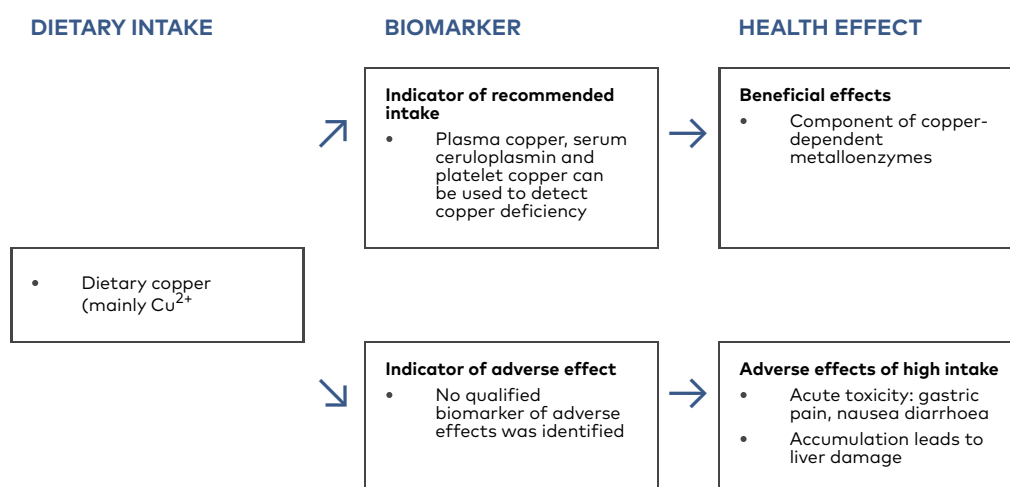


Copper



	Females	Males
AR (µg/d)	700	700
RI (µg/d)	900	900

For more information about the health effects, please refer to the background paper by Christine Henriksen and Erik Kristoffer Arnesen (Henriksen & Arnesen, 2023).

Dietary intake. Copper is found in a variety of foods. The average copper intake ranges from 1100 to 2100 µg/d (Lemming & Pitsi, 2022)

Main functions. Copper functions as a structural component in many proteins involved in energy and iron metabolism, production of neurotransmitters, formation of connective tissue, and endogenous antioxidant defence. Copper imbalances and copper deficiency have been linked to the pathogenesis of several chronic inflammatory diseases, but study design precludes conclusions about causality in these associations (Henriksen & Arnesen, 2023). Intake of high doses of copper leads to acute toxicity, which includes symptoms of gastric pain, nausea, vomiting, and diarrhoea. High chronic intakes of copper, for example in drinking water, can lead to gastro-intestinal disorders in children (Henriksen & Arnesen, 2023).

Interactions with other nutrients. Copper absorption is inhibited by the presence of other minerals, like zinc and iron, and compounds like phytates and oxalates that bind to Cu^{2+} in the gastrointestinal tract (Henriksen & Arnesen, 2023).

Indicator for recommended intake. Diets low in copper reduce the activity of several copper-dependent metalloenzymes. Plasma copper, serum ceruloplasmin and platelet copper has been used to indicate adequate copper status (IOM, 2001).

Main data gaps. A single sensitive and reliable biomarker of copper status is currently lacking (EFSA, 2015b). The role of copper imbalances in inflammatory and chronic disease needs further investigation.

Deficiency and risk groups. There are no risk groups for copper deficiency, but infants are sensitive to high intakes.

Recommendations. An intake of approximately 700–800 $\mu\text{g}/\text{d}$ will maintain adequate copper status (IOM, 2001) and no new balance studies have been published since NNR2012 (Henriksen & Arnesen, 2023). Few data are available on copper absorption and needs during pregnancy. Based on the accumulation of copper in the foetus and maternal tissue, an additional 100 μg per day was recommended. The calculation of the copper content of human breast milk is the basis of a recommendation on additional copper during lactation. Based on a combination of copper status indicators, AR is set to 700 $\mu\text{g}/\text{day}$ (females and males). RI is set to 900 $\mu\text{g}/\text{day}$ (females and males). The values are adopted from the IOM (IOM, 2001). UL is set to 5 mg for adults, corresponding to the ADI of 70 $\mu\text{g}/\text{kg}$, based on probability for retention in liver (EFSA, 2023).