

The association of dietary advanced glycation endproducts (AGEs) intake with cancer risk and potential related pathways to cancer development

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Purpose

A growing proportion of people in virtually all regions of the world have access to low-cost, but highly processed and energy-dense food products. In addition, ultra-processed foods represent also a major source of **dietary advanced glycation endproducts (AGEs)**. The global upwards trend in the consumption of ultra-processed foods and thereby also an increased intake of dietary AGEs leads to a growing interest in their potential health effects. Previous research suggested that ultra-processed foods and AGEs are involved in increasing the risk of obesity and cancer. In this project, we propose to comprehensively investigate the relationship between intake of major dietary AGEs and cancer risk in a prospective setting.

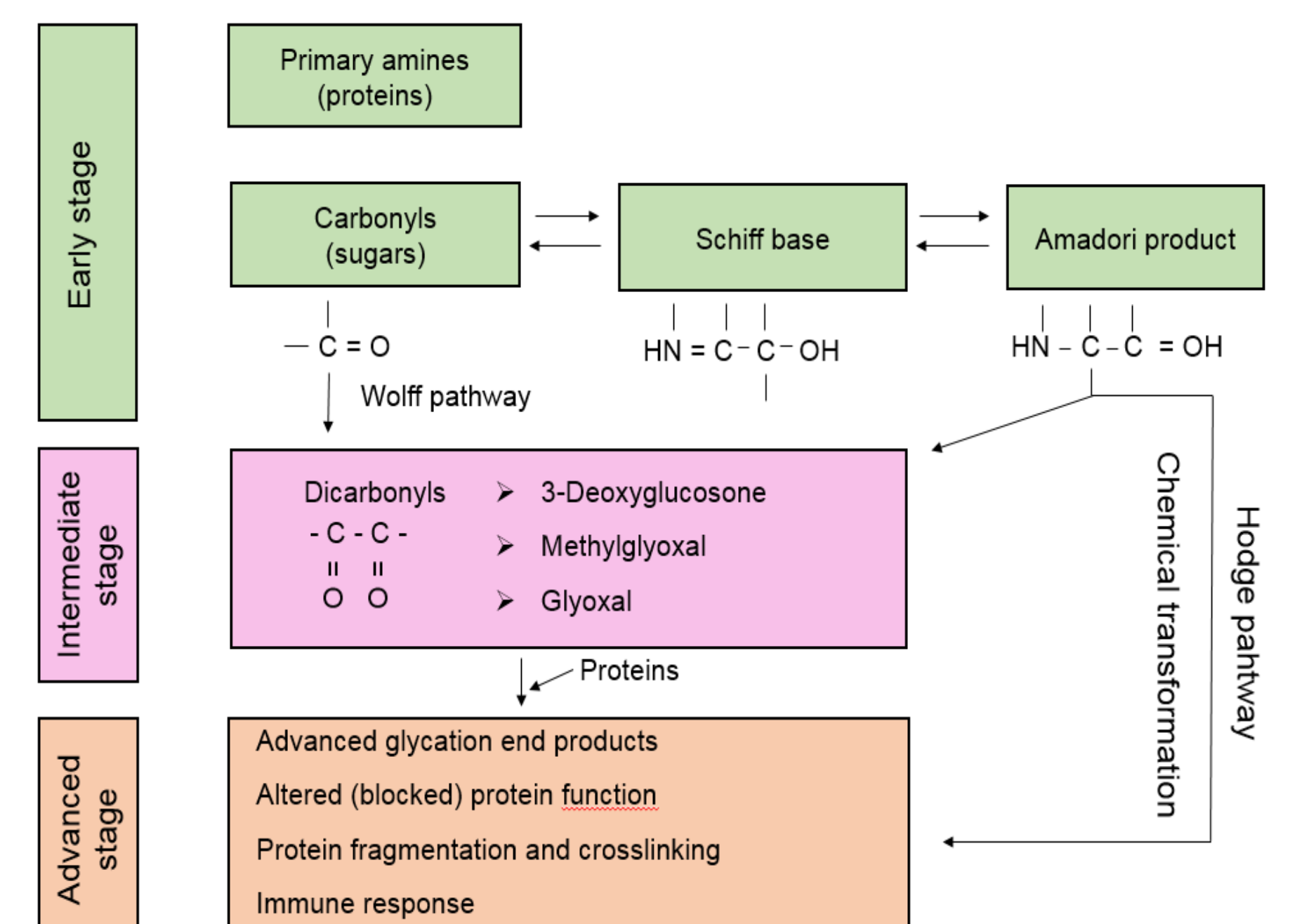
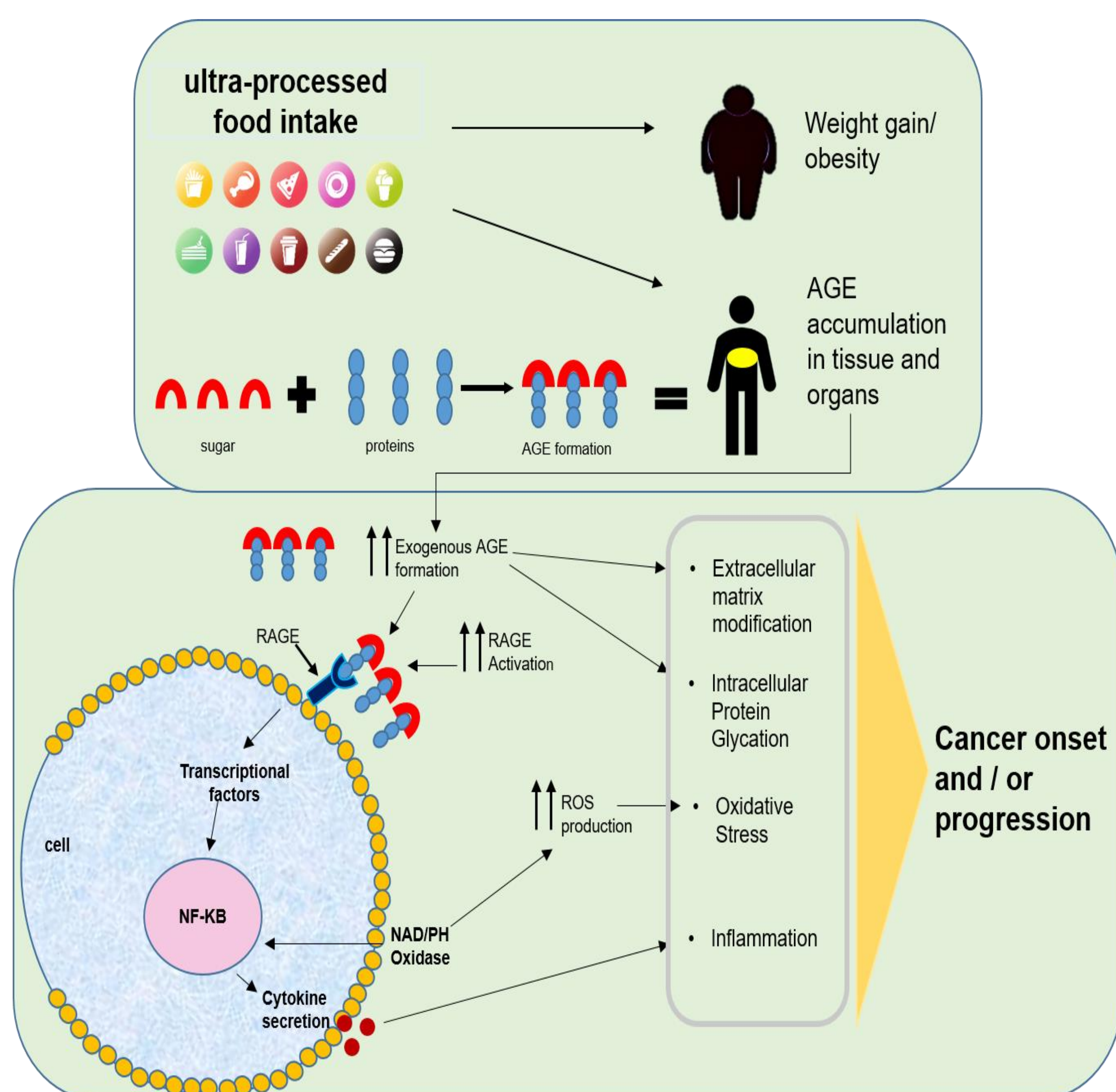


Figure1: Maillard reaction

Expected mechanism



Aims

- I. We will investigate the association between the intake of three well-defined dietary AGEs
 - N^ε-(carboxymethyl)-lysine (**CML**)
 - N^ε-(1-carboxyethyl)-lysine (**CEL**)
 - N^δ-(5-hydro-5-methyl-4-imidazol-2-yl)-ornithine (**MG-H1**)
 and the incidence of different **most common types of cancers**. We will use a novel dietary AGE database and the full data set of the **European Prospective Investigation into Cancer and Nutrition (EPIC) study**. EPIC is a multi-centre, prospective cohort study across **10 European countries** with a total of **521468** participants.
- II. Further, we will investigate to what extent the association between intake of dietary AGEs and cancer risk are mediated by obesity, and markers of inflammation, and oxidative stress using already available biomarker measurements.
- III. We will also assess the contribution of ultra-processed foods to dietary AGEs intake, and associations between ultra-processed food consumption and long-term weight gain and risk of becoming overweight or obese.

Methods

Statistical methods will include Cox proportional hazard models (full cohort) and conditional logistic regression (nested case-control) to estimate associations with risk of different cancers sites (odds ratios and hazard ratios [95%CI], respectively). Risk will be examined by categories of dietary AGEs, and with dietary AGEs on a continuous scale. Also, a newly food classification, called NOVA provides the ability to examine the quantity of consumed ultra-processed foods and consequently the quality of dietary patterns and their influence on health outcomes. Associations between the consumption of ultra-processed foods and body weight change and risk of becoming overweight/obese will be estimated by using multilevel mixed linear regression models.