



Contents lists available at ScienceDirect

Molecular Aspects of Medicine

journal homepage: www.elsevier.com/locate/mam

Nutrition epidemiology of flavan-3-ols: The known unknowns

Gunter G.C. Kuhnle

Department of Food & Nutritional Sciences, Harry Nursten Building, University of Reading, Reading RG6 6UR, United Kingdom

ARTICLE INFO

Article history:

Received 9 September 2017

Received in revised form

19 October 2017

Accepted 24 October 2017

Available online xxx

Keywords:

Flavan-3-ol

Nutritional epidemiology

Dietary assessment

Nutritional biomarker

Dietary recommendations

ABSTRACT

Nutritional epidemiology has an important role, as it can provide long-term data from large populations and does not rely on surrogate markers for morbidity/mortality. Meaningful interpretation and applications of outcomes from epidemiological studies depend on the accurate assessment of dietary intake, which is currently mainly based on a combination of self-reporting and food composition data.

Flavan-3-ols are a group of bioactives (non-essential dietary components with significant impact on health) that is a possible candidate for the development of dietary recommendations. The breadth of data available on their effect on health also provides the basis for investigating the suitability of the methods currently used in nutritional epidemiology to assess the health effects of bioactives. The outcomes of this assessment demonstrate that the limitations of currently used methods make it virtually impossible to estimate intake accurately from self-reported dietary data. This is due to the limitations of self-reporting, especially from food-frequency questionnaires, and the inability of currently used methods to deal with the high variability of food composition. Indeed, the estimated intake of flavan-3-ols, can only be interpreted as a marker of specific dietary patterns, but not as the actual intake amount.

The interpretation of results from such studies are fraught with serious limitations, especially for establishing associations between intake and health and the development of dietary recommendations. Alternative assessment not affected by these limitations, such as biomarkers, are required to overcome these limitations. The development of nutritional biomarkers is therefore crucial to investigate the health effect of bioactives.

© 2017 Published by Elsevier Ltd.

1. Background and introduction

Lifestyle choices, such as smoking, physical activity and diet, are important risk factors for CVD (Danaei et al., 2009; Ezzati and Riboli, 2013) and therefore an important target for disease prevention and health maintenance. In particular a low intake of plant-based foods has been identified as key contributor to disease burden (Lim et al., 2012), and this is reflected in dietary recommendations and guidelines. Apart from those nutrients essential to human life and procreation, plant-based foods contain phytochemicals, so called bioactives, that while not essential to human life, are proposed to affect human health by playing an important role in health maintenance and disease risk reduction. Consequently, there is an increasing interest in developing dietary recommendations and reference values (DRIs) for dietary bioactives (Lupton et al., 2014). Key challenges in this context lie in establishing a common assessment framework for bioactives, such as it exists for essential nutrients, including ways of establishing

causality between the dietary intake of a given bioactive and population-based measures of disease risk reduction or health maintenance (Yetley et al., 2017; Food and Nutrition Board, The National Academies of Sciences, Engineering and Medicine, 2017).

1.1. Flavan-3-ols

Flavan-3-ols are a complex group of bioactives, consisting of monomeric and polymeric compounds (Fig. 1). They have been extensively investigated for their role in human health and nutrition. Although the number of studies in this area is considerable, most data currently available derive from small-to medium-scale, short-term (weeks to several months) dietary intervention studies. Such studies inevitably rely on the assessment of surrogate endpoints, such as measures of vascular function (Heiss et al., 2010b), which inherently limits efforts aimed at translating study outcomes into high-rigor impact assessments of disease risk reduction and primary disease prevention (Weintraub et al., 2015; Bickdeli et al., 2017). While available data are promising, there currently exists a paucity of information from large-scale, long-term, randomised trials with mortality or morbidity outcomes. As a consequence, data

E-mail address: g.g.kuhnle@reading.ac.uk.<https://doi.org/10.1016/j.mam.2017.10.003>

0098-2997/© 2017 Published by Elsevier Ltd.

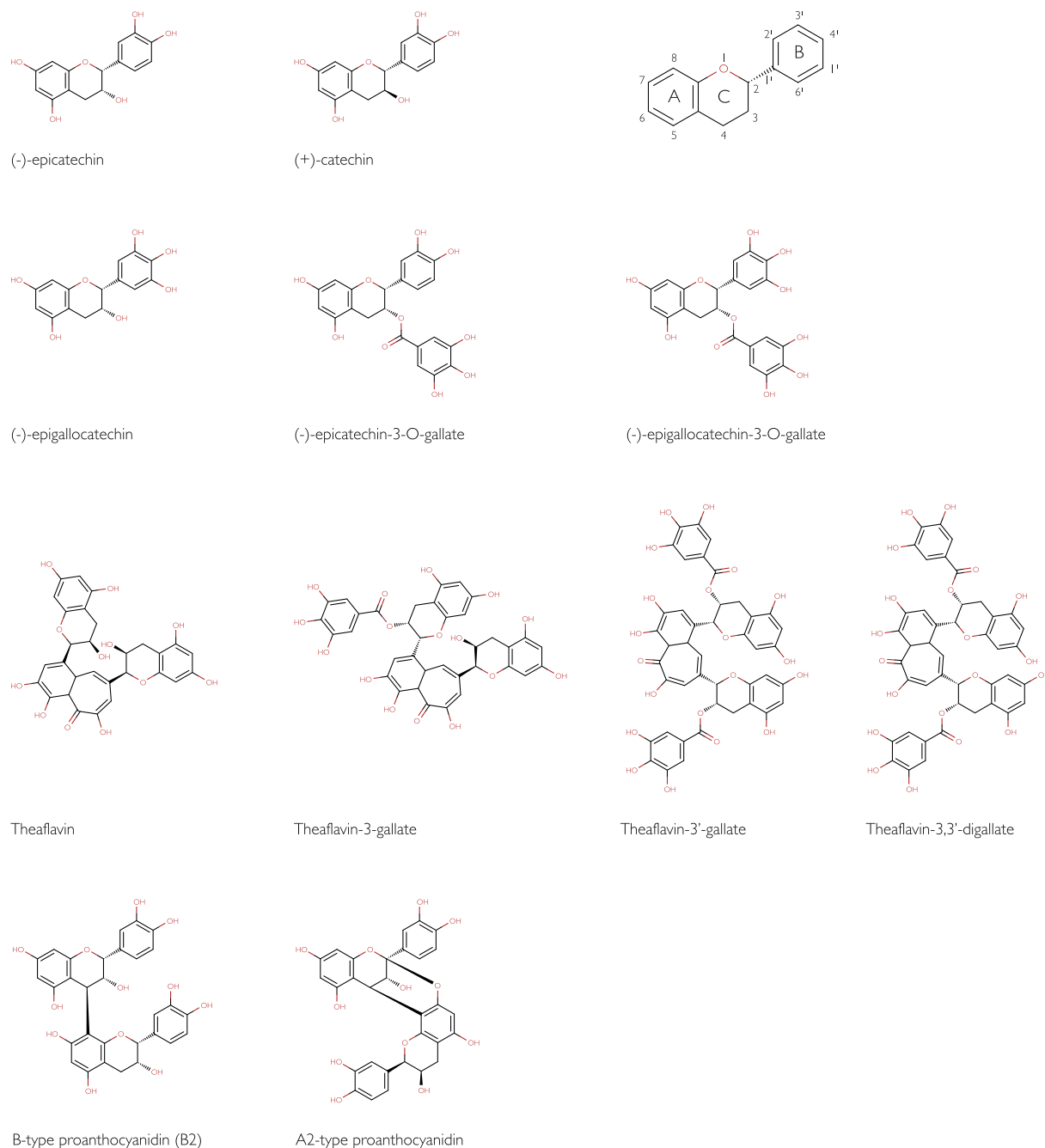


Fig. 1. Structures of monomeric and polymeric flavan-3-ols.

from prospective epidemiological studies may provide information on associations between long-term flavan-3-ol intake and health endpoints, despite of the well-known limitations regarding the establishment of causality (Mayne et al., 2012; Yetley et al., 2017).

This review will focus on currently available data and evaluate the strengths and limitations of nutritional epidemiology in investigating potential associations between flavan-3-ol intake and cardiovascular diseases risk.

2. Prospective epidemiological studies of flavan-3-ols and health

A key advantage of prospective cohort studies is that they can provide long-term data for a large and diverse study population

and the opportunity to investigate temporal associations. They also allow to investigate associations with disease risk, and do not require the use of surrogate endpoints, thus providing a better understanding of the association between intake and actual risk. However, epidemiological studies also have several limitations, in particular the vulnerability to confounding factors and difficulties associated with accurate intake assessments. The latter is especially crucial for the validity and applicability of outcome assessments based on data derived from prospective epidemiological studies (Yetley et al., 2017).

In most studies, flavan-3-ol intake is assessed by combining self-reported dietary information with data from food composition databases. While this has been tacitly accepted as *de facto* standard, it introduces a number of limitations that can affect outcomes and

Download English Version:

<https://daneshyari.com/en/article/8341403>

Download Persian Version:

<https://daneshyari.com/article/8341403>

[Daneshyari.com](https://daneshyari.com)