Prospective Association between Total and Specific Dietary Polyphenol Intakes and Cardiovascular Disease Risk in the Nutrinet-Santé French Cohort

Adriouch, S., et al. (2018). "Prospective Association between Total and Specific Dietary Polyphenol Intakes and Cardiovascular Disease Risk in the Nutrinet-Santé French Cohort." Nutrients 10(11).

Juice Plus+
Science Institute
Advancing plant-based nutrition

BACKGROUND

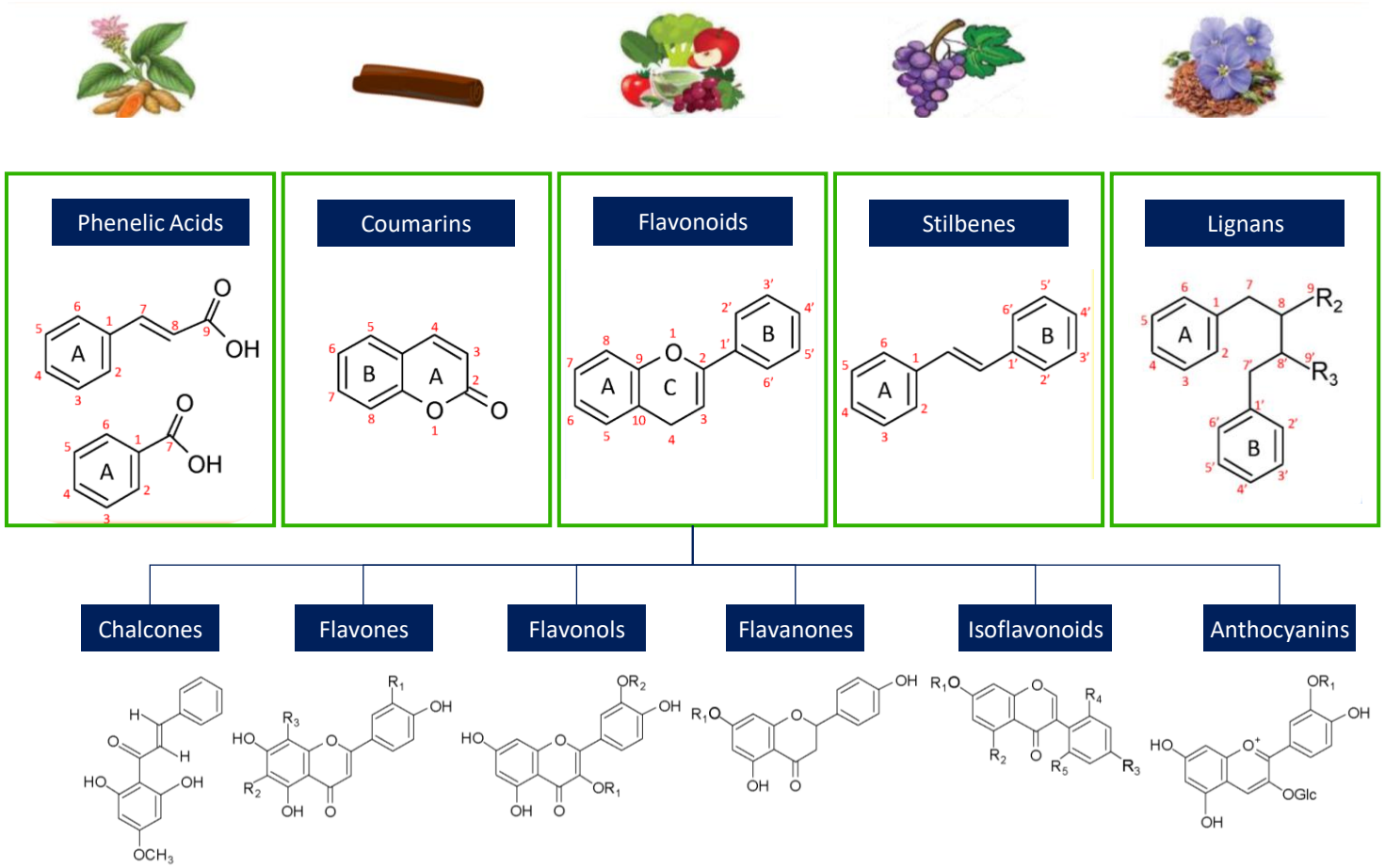
- Cardiovascular diseases account for almost one third of deaths worldwide.
- Previous research suggests that diets rich in polyphenols protect against CVDs and major CVD risk factors, such as hypertension, overweight, dyslipidaemia and diabetes.
- Diet is a major modifiable environmental factors involved in the aetiology of CVDs.
- This is attributed to:
  - Anti-inflammatory properties of polyphenols
  - Increased antioxidant capacity
  - Inhibition of platelet aggregation and antithrombotic properties

Juice Plus+ Science Institute
Advancing plant-based nutrition

AIM

The aim of this prospective study was to assess the association between total polyphenol intakes, as well as classes and subclasses of polyphenols, and the risk of incident CVDs, coronary heart diseases (CHD), and cerebrovascular diseases (CD) in the French NutriNet-Santé cohort.

Plant polyphenols



Juice Plus+ Science Institute
Advancing plant-based nutrition

METHODS

- Participants were volunteers from the NutriNet-Santé study, a prospective observational cohort study.
- Participants were asked to complete three non-consecutive, validated, web-based 24h dietary records at baseline and every six months.
- Those completing at least three 24h dietary records, between May 2009 and June 2017, were included in the analysis.
- Individual polyphenols intakes were obtained by matching food consumption data from the 24 h dietary records with the Phenol-Explorer database, which includes food composition data on 502 different polyphenols from 452 different foods.
- The present study focused on all first incident stroke, myocardial infarctions, acute coronary syndromes, and angioplasty diagnosed between the inclusion and June 2017.

Juice Plus+ Science Institute
Advancing plant-based nutrition

RESULTS I

- The analysis included 84,158 participants.
- Over a median of 4.9±1.6 years of follow-up, 602 first incident major cardiovascular events (309 CHD and 293 CD) were recorded.
- Among subjects who experienced a cardiovascular event, the mean age at cardiovascular event was 58.3±11.5 years.
- Mean total intake of polyphenols (sum of individual polyphenols) was 999±484 mg/day: 975±478 mg/day for women and 1087±498 for men.
- The main contributors to polyphenol intake were: coffee (49%), tea (23%), fruits (17%), vegetables (8%), and wine (5%).
- The main contributors to anthocyanin intake were strawberries and cherries.

Juice Plus+ Science Institute
Advancing plant-based nutrition

RESULTS II

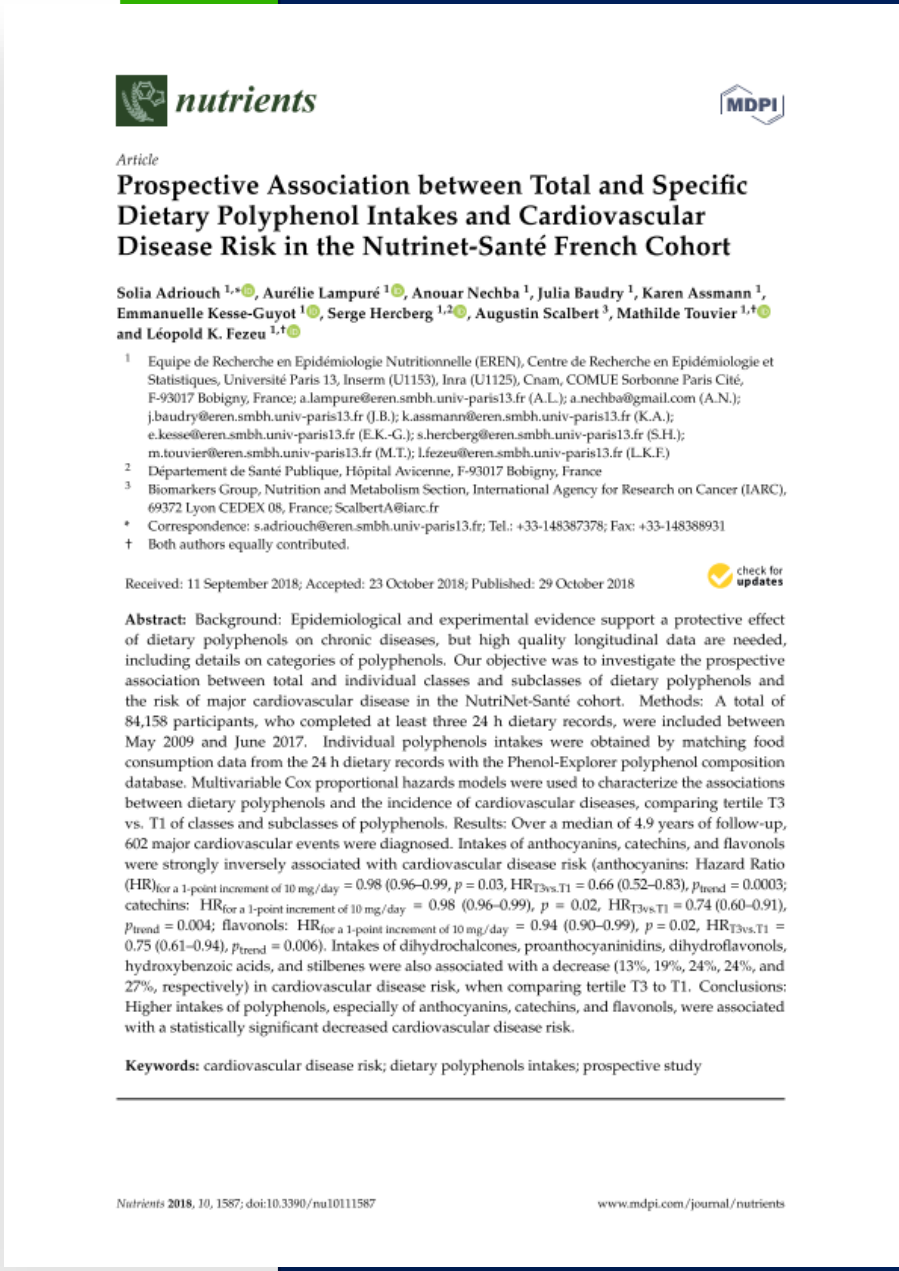
- There was a 34%, 26%, and 25% reduction in the risk of major cardiovascular events when comparing participants in the highest vs. the lowest tertiles of anthocyanins, catechins, and flavonols, respectively.
- Comparing participants in the highest vs. the lowest tertile, the intakes of dihydrochalcones, dihydroflavonols, proanthocyanidins, hydroxybenzoic acids, stilbenes, and total polyphenols were associated with a decrease of 13%, 19%, 24%, 24%, and 27% respectively, in the risk of total CVDs.
- Stratification by the type of CVDs, showed:
  - Intakes of anthocyanins and were associated with both a decreased risk of CHD and CD.
  - Intakes of flavonols and stilbenes wcatechinsere associated only with a decreased risk of CD.

Juice Plus+ Science Institute
Advancing plant-based nutrition

CONCLUSION

- High intakes of anthocyanins, dihydrochalcones, dihydroflavonols, catechins, proanthocyanidins, flavonols, hydroxybenzoic acids, and stilbenes, and total polyphenols were associated with a decreased risk of CVD.

- These subgroups of polyphenols may hence be of particular interest in the primary prevention of CVDs.



nutrients

MDPI

Article

Prospective Association between Total and Specific Dietary Polyphenol Intakes and Cardiovascular Disease Risk in the Nutrinet-Santé French Cohort

Solia Adriouch [1,*], Aurélie Lampuré [1], Anouar Nechba [1], Julia Baudry [1], Karen Assmann [1], Emmanuelle Kesse-Guyot [1], Serge Hercberg [1,2], Augustin Scalbert [3], Mathilde Touvier [1,†] and Léopold K. Fezeu [1,†]

1 Equipe de Recherche en Epidémiologie Nutritionnelle (EREN), Centre de Recherche en Epidémiologie et Statistiques, Université Paris 13, Inserm (U1153), Inra (U1125), Cnam, COMUE Sorbonne Paris Cité, F-93017 Bobigny, France; a.lampure@eren.smbh.univ-paris13.fr (A.L.); a.nechba@gmail.com (A.N.); j.baudry@eren.smbh.univ-paris13.fr (J.B.); k.assmann@eren.smbh.univ-paris13.fr (K.A.); e.kesse@eren.smbh.univ-paris13.fr (E.K.-G.); s.hercberg@eren.smbh.univ-paris13.fr (S.H.); m.touvier@eren.smbh.univ-paris13.fr (M.T.); l.fezeu@eren.smbh.univ-paris13.fr (L.K.F.)

2 Département de Santé Publique, Hôpital Avicenne, F-93017 Bobigny, France

3 Biomarkers Group, Nutrition and Metabolism Section, International Agency for Research on Cancer (IARC), 69372 Lyon CEDEX 08, France; ScalbertA@iarc.fr

* Correspondence: s.adriouch@eren.smbh.univ-paris13.fr; Tel.: +33-148387378; Fax: +33-148388931

† Both authors equally contributed.

Received: 11 September 2018; Accepted: 23 October 2018; Published: 29 October 2018

check for updates

Abstract: Background: Epidemiological and experimental evidence support a protective effect of dietary polyphenols on chronic diseases, but high quality longitudinal data are needed, including details on categories of polyphenols. Our objective was to investigate the prospective association between total and individual classes and subclasses of dietary polyphenols and the risk of major cardiovascular disease in the NutriNet-Santé cohort. Methods: A total of 84,158 participants, who completed at least three 24 h dietary records, were included between May 2009 and June 2017. Individual polyphenols intakes were obtained by matching food consumption data from the 24 h dietary records with the Phenol-Explorer polyphenol composition database. Multivariable Cox proportional hazards models were used to characterize the associations between dietary polyphenols and the incidence of cardiovascular diseases, comparing tertile T3 vs. T1 of classes and subclasses of polyphenols. Results: Over a median of 4.9 years of follow-up, 602 major cardiovascular events were diagnosed. Intakes of anthocyanins, catechins, and flavonols were strongly inversely associated with cardiovascular disease risk (anthocyanins: Hazard Ratio $(HR)_{\text{for a 1-point increment of 10 mg/day}} = 0.98$ (0.96–0.99, $p = 0.03$, $HR_{T3vs.T1} = 0.66$ (0.52–0.83), $p_{trend} = 0.0003$; catechins: $HR_{\text{for a 1-point increment of 10 mg/day}} = 0.98$ (0.96–0.99), $p = 0.02$, $HR_{T3vs.T1} = 0.74$ (0.60–0.91), $p_{trend} = 0.004$; flavonols: $HR_{\text{for a 1-point increment of 10 mg/day}} = 0.94$ (0.90–0.99), $p = 0.02$, $HR_{T3vs.T1} = 0.75$ (0.61–0.94), $p_{trend} = 0.006$). Intakes of dihydrochalcones, proanthocyaninidins, dihydroflavonols, hydroxybenzoic acids, and stilbenes were also associated with a decrease (13%, 19%, 24%, 24%, and 27%, respectively) in cardiovascular disease risk, when comparing tertile T3 to T1. Conclusions: Higher intakes of polyphenols, especially of anthocyanins, catechins, and flavonols, were associated with a statistically significant decreased cardiovascular disease risk.

Keywords: cardiovascular disease risk; dietary polyphenols intakes; prospective study

Article available at: https://doi.org/10.3390/nu10111587