

## Supplementary information

Supplemental Table 1: Odd ratio (OR) for meeting a biomarker-estimated flavanol intake of at least 500 mg/d in COSMOS and EPIC Norfolk, comparing sex, age and BMI using logistic regression analysis

	COSMOS	EPIC Norfolk
Sex (Male vs Female)	1.34 (1.16; 1.54)	1.36 (1.27; 1.45)
Age (75 vs 65 years old)	1.21 (1.06; 1.39)	0.91 (0.83; 0.99)
BMI (30 vs 25 kg/m <sup>2</sup> )	0.92 (0.85; 0.98)	1.12 (1.07; 1.17)

Supplemental Table 2: Association between markers of diet quality and urinary flavanol in COSMOS (difference in log<sub>2</sub> biomarker between bottom and top quartile of respective marker, adjusted by age, sex and BMI; 95% confidence interval and Wald-test).

	SREM <sub>B</sub>		gVLM <sub>B</sub>	
	β (95% CI)	p	β (95% CI)	p
Fruits	0.09 (0; 0.17)	0.057	0.08 (-0.01; 0.16)	<b>0.003</b>
Vegetables	-0.04 (-0.12; 0.04)	0.334	0.03 (-0.05; 0.11)	0.314
Fruits & Vegetables	0.03 (-0.05; 0.11)	0.650	0.06 (-0.02; 0.14)	0.056
Tea	0.26 (0.13; 0.40)	<b>&lt;0.001</b>	0.22 (0.08; 0.35)	<b>0.006</b>
aHEI	0.13 (0.03; 0.23)	<b>0.029</b>	0.33 (0.23; 0.43)	<b>&lt;0.001</b>

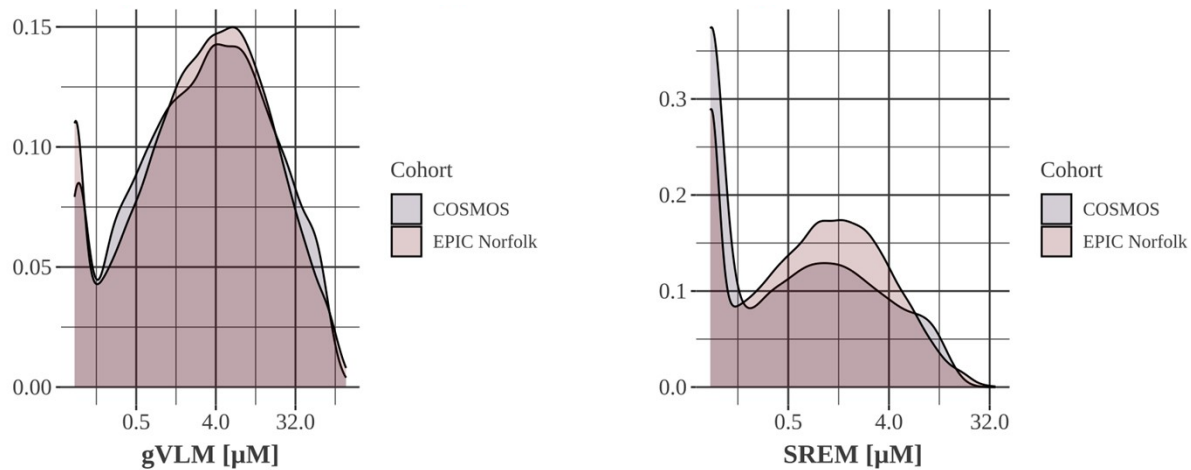
Supplemental Table 3: Association between markers of diet quality and urinary flavanol in EPIC Norfolk (difference in log<sub>2</sub> biomarker between bottom and top quartile of respective marker, adjusted by age, sex and BMI; 95% confidence interval and Wald-test).

	SREM <sub>B</sub>		gVLM <sub>B</sub>	
	β (95% CI)	p	β (95% CI)	p
Fruits	-0.06 (-0.11; -0.02)	0.0107	-0.15 (-0.21; -0.1)	<0.001
Vegetables	-0.09 (-0.13; -0.06)	<0.001	-0.1 (-0.14; -0.05)	<0.001
Fruits & Vegetables	-0.08 (-0.12; -0.05)	<0.001	-0.14 (-0.19; -0.1)	<0.001
Vitamin C	-0.14 (-0.17; -0.1)	<0.001	-0.09 (-0.13; -0.04)	<0.001
Tea	0.61 (0.58; 0.65)	<0.001	0.28 (0.23; 0.33)	<0.001

Supplemental Table 4: List of twenty most frequency consumed fruits and vegetables in NHANES 2017-2019.

Portion size was reported according to 21 CFR § 101.12.

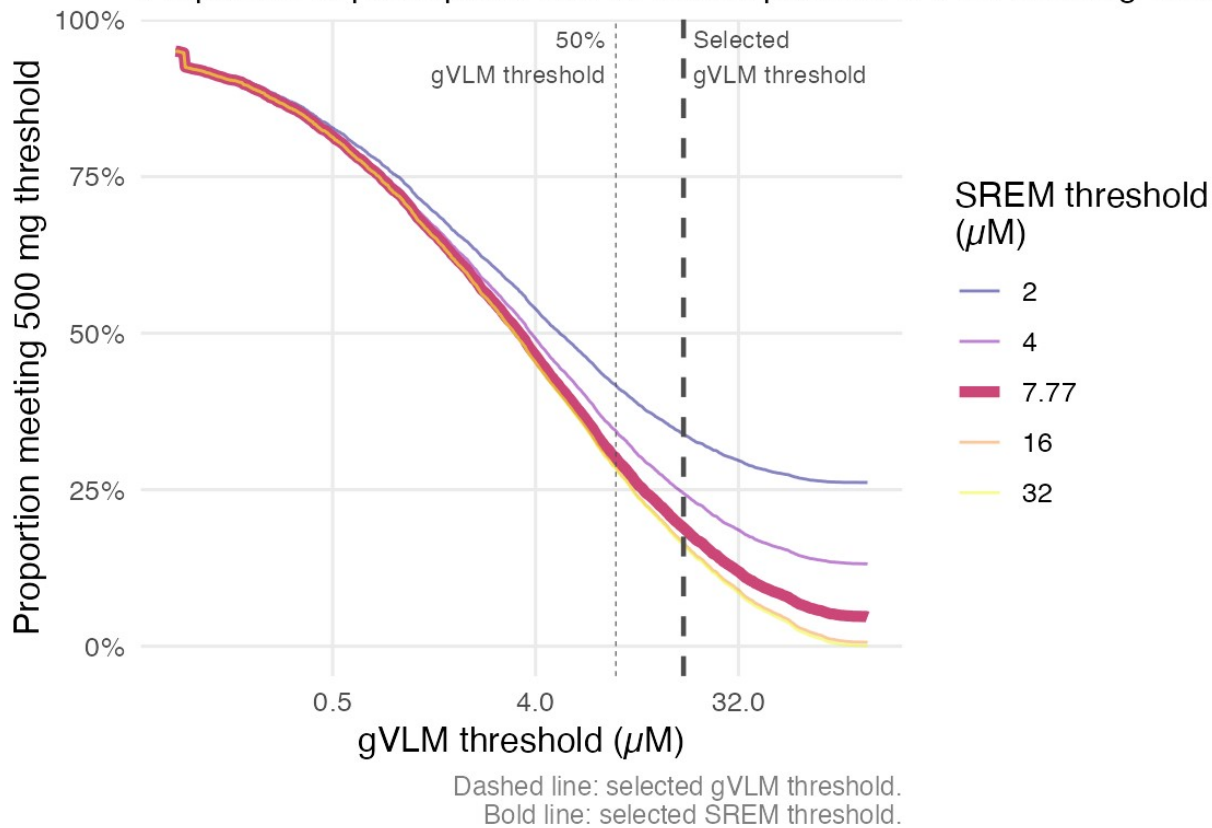
Food	Frequency (number of mentions in dietary recall)	Portion size (g)
Banana, raw	1112	140
Apple [Dessert], whole, raw	852	140
Tomato, whole, raw	705	85
Grape [Black]	463	140
Grape [Green]	463	140
Orange [Blond]	450	140
Carrot, raw	394	85
Strawberry, raw	386	140
Cucumber, raw	368	85
Green bean, raw	290	85
Melon	243	140
Avocado, raw	188	50
Peanut	185	30
Almond	172	30
Highbush blueberry, raw	152	140
Pineapple	149	140
Lettuce [Green], raw	126	85
Mango	108	140
Grape, raisin	101	40
Pear, whole	99	140



Supplemental Figure 1: Distribution of  $\text{gVLM}_B$  and  $\text{SREM}_B$  concentration between COSMOS and EPIC Norfolk.  $\text{gVLM}_B$ : 5-(3',4'-dihydroxyphenyl)- $\gamma$ -valerolactone metabolites;  $\text{SREM}_B$ : structurally related (-)-epicatechin metabolites

## Sensitivity analysis

Proportion of participants with at least 5 portions of F&V meeting flavan



Supplemental Figure 2: Sensitivity analysis assessing changes in the proportion of participants meeting a biomarker-estimated intake of 500 mg of flavanols among participants having at least 5 portions of fruit and vegetables when varying the threshold for the biomarkers 5-(3',4'-dihydroxyphenyl)- $\gamma$ -valerolactone metabolites (gVLM<sub>B</sub>) and structurally related (-)-epicatechin metabolites (SREM<sub>B</sub>) in COSMOS and EPIC studies.