Supplementary material to

Phytoestrogens and Thyroid Function

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Age in Years	FT4		TT4	
	AGM in ng/dL	Significant Differences	AGM in µg/mL	Significant Differences
12-19 (A12)	0.8 (0.78 - 0.83)	A12 > A20 (p<0.01)	7.86 (7.65 - 8.07)	
20-64 (A64)	0.78 (0.76 - 0.8)	A20 < A65 (p=0.01)	7.81 (7.64 - 7.99)	
65+ (A65)	0.8 (0.78 - 0.83)		7.87 (7.67 - 8.08)	

Table S1. Adjusted geometric means (AGM) with 95% confidence intervals for selected thyroid hormones. Data from National Health and Nutrition Examination Survey 2007-2010.

Table S2. Adjusted geometric means with 95% confidence intervals for selected thyroid hormones by age by race/ethnicity. Data from National Health and Nutrition Examination Survey 2007-2010.

	TSH	**FT3**	**TT3**	**TGN**
	AGM in mIU/L	A GM in pg/mL	AGM in ng/dL	AGM in ng/mL
Age 12-19, Non-Hispanic White (A12_NHW)	1.42 (1.31 - 1.53)	3.61 (3.56 - 3.66)	137.5 (133.42 - 141.71)	10.19 (9.27 - 11.19)
Age 12-19, Non-Hispanic Black (A12_NHB)	1.24 (1.14 - 1.35)	3.4 (3.32 - 3.48)	122.45 (117.48 - 127.64)	13.32 (11.87 - 14.95)
Age 12-19, Hispanic (A12_HISP)	1.32 (1.2 - 1.44)	3.62 (3.54 - 3.7)	133.2 (128.7 - 137.85)	8.44 (7.58 - 9.41)
Age 12-19, Others (A12_OTH)	1.27 (0.99 - 1.61)	3.48 (3.33 - 3.65)	126.28 (119.38 - 133.57)	11.65 (9.29 - 14.59)
Age 20-64, Non-Hispanic White (A20_NHW)	1.45 (1.39 - 1.52)	3.23 (3.2 - 3.27)	115.84 (112.6 - 119.18)	11.07 (10.2 - 12.02)
Age 20-64, Non-Hispanic Black (A20_NHB)	1.13 (1.05 - 1.21)	3.2 (3.15 - 3.26)	111.43 (107.75 - 115.24)	15.08 (13.78 - 16.5)
Age 20-64, Hispanic (A20_HISP)	1.33 (1.25 - 1.41)	3.34 (3.3 - 3.39)	117.9 (115.01 - 120.85)	8.56 (7.58 - 9.66)
Age 20-64, Others (A20_OTH)	1.27 (1.13 - 1.44)	3.29 (3.21 - 3.37)	113.58 (108.57 - 118.82)	10.45 (8.81 - 12.39)
Age 65+, Non-Hispanic White (A65_NHW)	1.78 (1.67 - 1.89)	3 (2.95 - 3.06)	105.98 (103.27 - 108.75)	10.76 (9.44 - 12.26)
Age 65+, Non-Hispanic Black (A65_NHB)	1.2 (1.08 - 1.34)	2.89 (2.81 - 2.96)	98.17 (93.48 - 103.1)	15.96 (13.65 - 18.66)
Age 65+, Hispanic (A65_HISP)	1.59 (1.4 - 1.81)	3.03 (2.97 - 3.09)	107.78 (103.08 - 112.69)	12.45 (10.35 - 14.99)
Age 65+, Others (A65_OTH)	1.44 (1.11 - 1.88)	3.04 (2.8 - 3.29)	104.47 (97.43 - 112.03)	12.15 (3.37 - 43.85)

Significant racial/ethnic differences within age groups	A12_NHW > A12_NHB (p<0.01), A20_NHW > A20_HISP > A20_NHB (p<0.01), A65_NHW > A65_NHB, A65_NHB < A65_HISP (p<0.01)	A12_NHW > A12_NHB (p<0.01), A12_NHB < A12_HISP (p<0.01), A20_NHW < A20_HISP (p<0.01), A20_NHB < A20_HISP (p<0.01), A20_NHB < A20_OTH (p<0.01), A65_NHW < A65_NHB (p<0.01), A65_NHB < A65_HISP (p<0.01)	A12_NHW > A12_NHB (p<0.01), A12_NHB < A12_HISP (p<0.01), A20_NHW > A20_NHB (p=0.01), A20_NHB < A20_HISP (<0.01), A65_NHW > A65_NHB (p<0.01), A65_NHB < A65_HISP	A12_NHB > A12_NHW > A12_HISP (p<0.01), A20_NHB > A20_NHW > A20_HISP (p<0.01), A65_NHW < A65_NHB (p<0.0), A65_NHB > A65_HISP (p<0.01)
Significant age differences within racial/ethnic groups	A12_NHW < A65_NHW (p<0.01), A20_NHW < A65_NHW (p<0.01), A12_HISP < A65_HISP, A20_HISP < A65_HISP	A12_NHW > A20_NHW > A65_NHW (p<0.01), A12_NHB > A20_NHB > A65_NHB (p<0.01), A12_HISP > A20_HISP > A65_HISP (p<0.01)	A12_NHW > A20_NHW > A65_NHW (p<0.01), A12_NHB > A20_NHB > A65_NHB (p<0.01), A12_HISP > A20_HISP > A65_HISP (p<0.01)	A12_NHB < A65_NHB (p=0.04), A12_HISP < A65_HISP (p<0.01), A20_HISP < A65_HISP (p<0.01)

Table S3. Adjusted geometric means with 95% confidence intervals by age by iodine sufficiency status for TT3 in ng/dL. Data from National Health and Nutrition Examination Survey 2007-2010.

Age 12-19 years, iodine deficient (A12_IOD)	131.92 (127.6 - 136.38)	A65_IOD > A65_IOR (p<0.01), A12_IOD > A20_IOD > A65_IOD (p<0.01), A12_IOR > A20_IOR > A65_IOR (p<0.01)
Age 12-19 years, iodine replete (A12_IOR)	127.57 (122.83 - 132.49)	
Age 20-64 years, iodine deficient (A20_IOD)	115.11 (112.62 - 117.66)	
Age 20-64 years, iodine replete (A20_IOR)	114.21 (110.76 - 117.77)	
Age 65+ years, iodine deficient (A65_IOD)	108.07 (104.47 - 111.78)	
Age 65+ years, iodine replete (A65_IOR)	100.16 (97.47 - 102.92)	

Table S4. Adjusted geometric means with 95% confidence intervals by age by smoking status for FT3 in pg/mL. Data from National Health and Nutrition Examination Survey 2007-2010.

Age 12-19 years, non smokers (A12_NSM)	3.59 (3.54 - 3.63)	A12_NSM > A12_SM ($p<0.01$), A65_NSM < A65_SM ($p<0.01$), A12_NSM > A20_NSM > A65_NSM ($p<0.01$), A12_SM > A20_SM > A65_SM ($p<0.01$)
Age 12-19 years, smokers (A12_SM)	3.47 (3.37 - 3.57)	
Age 20-64 years, non smokers (A20_NSM)	3.24 (3.2 - 3.28)	
Age 20-64 years, smokers (A20_SM)	3.29 (3.24 - 3.35)	
Age 65+ years, non smokers (A65_NSM)	2.94 (2.89 - 3)	
Age 65+ years, smokers (A65_SM)	3.03 (2.94 - 3.13)	

Table S5. Adjusted geometric means with 95% confidence intervals for selected thyroid hormones by gender by age. Data from National Health and Nutrition Examination Survey 2007-2010.

	TSH	FT3	TT3
	AGM in mIU/L	AGM in pg/mL	AGM in ng/dL
Males aged 12-19 years (M_A12)	1.32 (1.19 - 1.47)	3.65 (3.59 - 3.73)	133.42 (129.12 - 137.88)
Males aged 20-64 years (M_A20)	1.35 (1.3 - 1.41)	3.35 (3.32 - 3.39)	115.39 (112.88 - 117.97)
Males aged 65+ years (M_A65)	1.4 (1.31 - 1.5)	3.03 (2.96 - 3.1)	102.52 (99.62 - 105.5)
Females aged 12-19 years (F_A12)	1.29 (1.19 - 1.41)	3.4 (3.32 - 3.49)	126.13 (121.54 - 130.89)
Females aged 20-64 years (F_A20)	1.23 (1.14 - 1.33)	3.18 (3.13 - 3.23)	113.94 (110.72 - 117.24)
Females aged 65+ years (F_A65)	1.59 (1.43 - 1.76)	2.95 (2.87 - 3.03)	105.58 (102.05 - 109.23)
Significant Differences	M_A20 > F_A20	M_A12 >	M_A12 > F_A12

	(p=0.03), M_A65 < F_A65 (p<0.01), F_A64 < F_A65 (p<0.01)	F_A12 (p<0.01), M_A20 > F_A20 (p<0.01), M_A65 > F_A65 (p<0.01), M_A12 > M_A20 > M_A65 (p<0.01), F_A12 > F_A20 > F_A65 (p<0.01)	(p<0.01), M_A20 > F_A20 (p<0.01), M_A12 > M_A20 > M_A65 (p<0.01), F_A12 > F_A20 > F_A65 (p<0.01)

Table S6. Adjusted geometric means with 95% confidence intervals for selected thyroid hormones by gender by race/ethnicity. Data from National Health and Nutrition Examination Survey 2007-2010.

	FT4	TT4	TGN
	AGM in ng/dL	AGM in µg/mL	AGM in ng/mL
Males, Non-Hispanic White (M_NHW)	0.79 (0.77 - 0.81)	7.41 (7.27 - 7.55)	9.7 (8.82 - 10.66)
Males, Non-Hispanic Black (M_NHB)	0.76 (0.74 - 0.79)	7.37 (7.11 - 7.64)	13.33 (11.83 - 15.01)
Males, Hispanic (M_HISP)	0.8 (0.78 - 0.82)	7.78 (7.59 - 7.97)	9.45 (8.69 - 10.28)
Males, Others (M_OTH)	0.83 (0.8 - 0.86)	8.25 (7.87 - 8.65)	9.07 (5.7 - 14.43)
Females, Non-Hispanic White (F_NHW)	0.78 (0.76 - 0.8)	7.76 (7.61 - 7.92)	11.73 (10.7 - 12.87)
Females, Non-Hispanic Black (F_NHB)	0.8 (0.77 - 0.84)	7.94 (7.75 - 8.13)	16.31 (14.97 - 17.78)
Females, Hispanic (F_HISP)	0.79 (0.76 - 0.81)	8.26 (8.02 - 8.52)	9.87 (8.5 - 11.45)
Females, Others (F_OTH)	0.82 (0.77 - 0.87)	8.06 (7.75 - 8.38)	14.32 (8.91 - 23.01)

Significant Differences	M_NHW < F_NHB (p=0.03), M_NHW > M_NHB (p=0.02), M_NHW < M_OTH (p=0.02), M_NHB < M_OTH (p<0.01), M_HISP < M_OTH (p<0.01)	M_NHW < F_NHW (p<0.01), M_NHB < F_NHB (p<0.01), M_HISP < F_HISP (p<0.01), M_NHW < M_HISP (p<0.1), M_NHW < M_OTH (p<0.01), M_NHB < M_HISP (p<0.01), M_NHB < M_OTH (p<0.01), M_HISP < M_OTH (p<0.01), F_NHW < F_HISP (p<0.01), F_NHB < F_HISP (p<0.01)	M_NHW < F_NHW (p<0.01), M_NHB < F_NHB (p<0.01), M_OTH < F_OTH (p<0.01), M_NHW < M_NHB (p<0.01), M_NHB > M_HISP (p<0.01), F_NHW < F_NHB (p<0.01), M_NHW > F_HISP (p<0.01), F_NHB < F_HISP (p<0.01)

Table S7. Adjusted geometric means (AGM) with 95% confidence intervals for selected thyroid hormones. Data from National Health and Examination Survey 2077-2010.

	Smoking Status			Iodine Sufficiency Status		
	Nonsmoker	Smoker	p	Deficient	Replete	p
TSH in mIU/L	1.46 (1.4 - 1.52)	1.26 (1.19 - 1.35)	<0.01	1.32 (1.23 - 1.41)	1.4 (1.35 - 1.46)	0.047
FT3 in pg/mL				3.27 (3.23 - 3.31)	3.24 (3.2 - 3.28)	0.52
FT4 in ng/dL	0.79 (0.77 - 0.81)	0.8 (0.78 - 0.82)	0.20	0.8 (0.78 - 0.82)	0.79 (0.77 - 0.82)	0.16
TT3 in ng/dL	114.97 (112.92 - 117.06)	116.37 (112.68 - 120.18)	0.43			
TT4 in µg/mL	7.81 (7.66 - 7.96)	7.88 (7.67 - 8.11)	0.50	7.88 (7.76 - 8.01)	7.81 (7.61 - 8.02)	0.35
TGN in ng/mL	9.98 (8.8 - 11.31)	13.18 (11.17 - 15.54)	<0.01	12.06 (10.09 - 14.41)	10.91 (9.71 - 12.26)	0.08

Table S8. Spearman's correlations* of various phytoestrogens with urinary iodine.

Urine Iodine Status	Daidzein	O-Desmethyl-angolensin	Equol	Enteridiol	Enterolactone	Genistein
Total	0.25	0.16	0.43	0.18	0.14	0.25
Deficient	0.21	0.13	0.37	0.22	0.16	0.22
Replete	0.13	0.08	0.21	0.08	0.02	0.14
*All correlations were statistically significantly different than zero ($p<0.01$).						

Table S9. Unadjusted geometric means* (UGM) with 95% confidence intervals in ng/mL for selected phytoestrogens by iodine sufficinecy status. Data from National Health and Nutrition Examination Survey 2007-2010.

Iodine Sufficiency Status	Daidzein	O-Desmethyl-angolensin	Equol	Enteridiol	Enterolactone	Genistein
Deficient	38.93(34.22 - 44.28)	2.87(2.44 - 3.38)	3.69(3.3 - 4.13)	27.59(23.8 - 31.98)	159.09(138.15 - 183.19)	19.68(17.19 - 22.53)
Replete	84.2(75.36 - 94.07)	5.5(4.7 - 6.43)	10.15(9.02 - 11.42)	42.77(38.43 - 47.61)	259.75(235.01 - 287.09)	38.74(34.54 - 43.45)
*All UGMs between iodine deficient and iodine replete groups were statistically significantly different ($p<0.01$).						