

## Online Supplemental Material

### Supplemental TABLE 1 Participant characteristics and baseline blood chemistry

ID, sex	Participant characteristics				Plasma cholesterol / triglyceride			Plasma $\alpha$ -tocopherol			RBC $\alpha$ -tocopherol		
	age	weight	BMI	PCV	HDL-chol	LDL-chol	TG	-14 d	-7 d	0 d	-14 d	-7 d	0 d
	<i>y</i>	<i>kg</i>	<i>kg/m<sup>2</sup></i>	<i>%</i>	<i>mmol/L</i>	<i>mmol/L</i>	<i>mmol/L</i>	$\mu\text{mol/L}$	$\mu\text{mol/L}$	$\mu\text{mol/L}$	$\mu\text{mol/L}$	$\mu\text{mol/L}$	$\mu\text{mol/L}$
2, F	25	50	19	40	2.0	1.9	0.7	30	28	23	4.2	3.0	3.1
3, F	23	58	20	37	1.4	3.4	0.9	25	24	25	2.5	1.4	2.4
4, M	22	75	23	39	1.6	2.8	0.5	21	19	20	3.8	2.7	2.9
5, M	23	84	24	39	1.0	3.0	1.5	25	25	22	3.3	2.7	2.9
6, F	26	59	21	44	1.5	3.2	1.5	20	19	17	3.1	2.9	3.0
7, M	25	70	22	46	1.0	2.5	0.5	21	21	20	3.2	2.4	2.2
8, M	39	78	22	44	1.2	3.2	1.2	24	24	24	3.8	3.8	3.3
9, M	32	78	25	44	1.0	3.0	0.7	20	22	17	2.9	3.0	2.6
10, M	23	77	23	40	1.1	2.9	0.8	22	25	20	2.6	2.5	2.5
11, F	29	59	21	40	2.1	2.3	0.8	27	26	22	2.6	2.4	2.2
12, F	39	57	20	39	1.7	3.2	0.6	23	25	25	2.6	2.0	2.2
13, F	19	59	21	37	1.9	3.4	1.3	26	25	25	3.3	2.5	2.3
$\bar{x} \pm \text{SD}^1$	27 $\pm$ 7	67 $\pm$ 11	22 $\pm$ 2	41 $\pm$ 3	1.5 $\pm$ 0.4	2.9 $\pm$ 0.5	0.9 $\pm$ 0.4	24 $\pm$ 3	24 $\pm$ 3	22 $\pm$ 3	3.2 $\pm$ 0.6	2.6 $\pm$ 0.6	2.6 $\pm$ 0.4

<sup>1</sup>Data are presented as mean  $\pm$  SD. Abbreviations used: BMI, body mass index; Chol, cholesterol; PCV, packed cell volume; TG, triglyceride

## Online Supplemental Material

### Supplemental TABLE 2 Dietary intake assessed by food frequency questionnaire

Food frequency questionnaire													
ID, sex	Energy	Protein	Fiber	Total fat	Sat fat	Mono fat	Poly fat	Trans fat	n-3 fat	CHOL	α-TOC	Vit C	Selenium
	<i>MJ/d</i>	<i>g/d</i>	<i>g/d</i>	<i>g/d</i>	<i>g/d</i>	<i>g/d</i>	<i>g/d</i>	<i>g/d</i>	<i>g/d</i>	<i>mg/d</i>	<i>mg/d</i>	<i>mg/d</i>	<i>μg/d</i>
2, F	6.9	58	21	57	17	21	14	2	2	173	7.4	83.0	99.1
3, F	6.6	64	14	59	18	24	13	2	1	157	6.4	91.2	90.9
4, M	10	97	12	79	31	31	11	3	1	271	5.3	53.6	120
5, M	17	135	27	167	56	64	34	8	3	392	15	107	163
6, F	7.8	85	20	72	27	27	13	2	2	267	6.8	77.3	108
7, M	9.1	89	18	83	32	30	14	3	1	289	6.9	57.5	109
8, M	12	93	25	122	45	46	22	4	2	383	11	105	129
9, M	5.5	67	10	60	18	21	15	2	1	275	5.0	78.5	275
10, M	10	95	15	98	34	37	19	4	2	286	7.5	67.4	117
11, F	7.4	69	15	75	19	32	18	1	2	241	8.5	129	78.1
12, F	5.8	59	15	62	22	24	12	2	1	248	6.5	81.4	75.5
13, F	6.8	55	18	52	18	20	10	2	2	157	5.4	82.8	85.9
$\bar{x} \pm SD^1$	8.8 ± 3.2	81 ± 23	18 ± 5	82 ± 33	27 ± 14	31 ± 13	16 ± 7	3 ± 2	2 ± 1	233 ± 90	7.6 ± 2.8	84.4 ± 21.4	121 ± 54

<sup>1</sup>Data are presented as mean ± SD. Abbreviations used: Sat Fat, saturated fat; Mono Fat, mono unsaturated fat; Poly Fat, polyunsaturated fat; n-3 fat, n-3 fatty acid; CHOL, cholesterol; vit C, vitamin C

## Online Supplemental Material

### Supplemental TABLE 3 Mass balance and retention of ingested <sup>14</sup>C over the first 21 d since dosing

ID, sex	Endogenous and total urine <sup>14</sup> C eliminated			Fecal, metabolic fecal, and total <sup>14</sup> C eliminated			Absorption		Mass Balance	
	0-3 d % of dose	4-21 d % of dose	Total % of dose	0-3 d % of dose	4-21 d % of dose	Total % of dose	Apparent % of dose	True % of dose	Total eliminated % of dose	Total retained % of dose
2, F	1.21	0.34	1.54	18.0	1.57	19.6	82.0	83.5	21.2	78.9
3, F	6.92	0.26	7.17	8.10	2.04	10.1	91.9	93.9	17.3	82.7
4, M	3.56	0.55	4.11	22.7	2.37	25.1	77.3	79.6	29.2	70.8
5, M	2.70	0.47	3.17	26.7	4.08	30.8	73.3	77.4	34.0	66.1
6, F	3.66	1.14	4.81	18.8	2.96	21.7	81.2	84.2	26.5	73.5
7, M	3.07	0.67	3.74	20.3	2.64	22.9	79.7	82.4	26.7	73.3
8, M	3.36	0.61	3.96	18.8	3.39	22.2	81.2	84.6	26.1	73.9
9, M	4.05	0.22	4.27	25.5	3.22	28.8	74.4	77.6	33.1	66.9
10, M	3.35	0.43	3.77	15.3	1.72	17.0	84.8	86.5	20.7	79.3
11, F	3.48	0.27	3.75	28.3	1.02	29.3	71.7	72.7	33.1	66.9
12, F	5.05	0.69	5.73	22.1	2.09	24.2	77.9	80.0	29.9	70.0
13, F	4.58	0.51	5.08	25.1	2.06	27.1	74.9	77.0	32.2	67.8
$\bar{x} \pm SD^1$	3.75 ±1.38	0.51 ±0.25	4.26 ±1.38	20.8 ±5.6	2.43 ±0.87	23.2 ±5.8	79.2 ±5.6	81.6 ±5.5	27.5 ±5.2	72.5 ±5.5
Prior studies <sup>(Ref)</sup>										
RRR- $\alpha$ -Toc <sup>(26)</sup>	3.97	2.35	6.32	24.7	3.11	27.9	75.3	78.4	34.1	65.8
all-rac- $\alpha$ -Toc <sup>(26)</sup>	11.6	4.98	16.5	24.5	6.94	31.5	75.5	82.4	48.0	60.4
all-rac- $\alpha$ -Toc <sup>(28)</sup>	< 6.00	-	< 6.00	-	-	27.6*	72.4	-	33.6	66.4
all-rac- $\alpha$ -Toc <sup>(29)</sup>	8.21	-	8.21	-	-	31.4*	68.6	-	39.6	52.0

<sup>1</sup>Data are presented as mean  $\pm$  SD. \*Duration of fecal collections was  $\leq$  12 d

**Online Supplemental Material**

**Supplemental TABLE 4**  $^{14}\text{C}$  concentration maxima ( $C_{\text{max}}$ ) and time to maxima ( $T_{\text{max}}$ ) in plasma, red blood cells, urine and feces

ID, sex	Plasma		RBC		Urine		Feces	
	$C_{\text{max}}$ % dose/ L plasma	$T_{\text{max}}$ d	$C_{\text{max}}$ % dose/ L RBC	$T_{\text{max}}$ d	$C_{\text{max}}$ % dose/ collection	$T_{\text{max}}$ d	$C_{\text{max}}$ % dose/ collection	$T_{\text{max}}$ d
2, F	7.17	0.49	1.75	1.00	0.19	2.00	7.81	1.04
3, F	5.63	0.49	1.77	0.83	1.85	3.00	6.63	3.47
4, M	3.75	0.50	1.89	0.92	1.03	1.25	14.1	2.27
5, M	3.44	0.75	1.89	0.83	0.71	0.25	13.4	1.19
6, F	7.70	0.42	1.75	0.92	0.72	0.50	8.12	1.97
7, M	5.09	0.42	1.49	0.92	0.51	3.00	10.0	2.99
8, M	3.49	0.83	0.92	0.92	0.49	0.50	8.91	2.13
9, M	5.89	0.50	1.36	0.92	0.52	3.00	10.2	2.99
10, M	4.32	0.83	1.60	0.83	0.49	0.50	4.43	1.60
11, F	4.37	0.38	1.12	1.00	0.73	0.50	16.3	1.21
12, F	6.02	0.75	1.66	0.92	0.68	2.00	7.84	2.43
13, F	7.83	0.58	1.87	1.33	0.67	0.50	14.7	2.15
$\bar{x} \pm \text{SD}^1$	5.39±1.58	0.58 ±0.17	1.59±0.31	0.94±0.13	0.72±0.41	1.42±1.12	10.2±3.6	2.12 ±0.77
Priors <sup>(Ref)</sup>	5.92±1.90 <sup>(21)</sup>	0.53±0.24 <sup>(21)</sup>	1.09±0.32 <sup>(21)</sup>	1.06±0.41 <sup>(21)</sup>	-	-	-	-

<sup>1</sup>Data are presented as mean ± SD

## Online Supplemental Material

### Supplemental TABLE 5 Effects of study duration on plasma and RBC RRR- $\alpha$ -tocopherol area under the curve

Plasma										
ID, sex	0-2 d		0-4 d		0-5 d		0-70 d		0-460 d	
	$t_{1/2}$ 0-2 %dose/L•d	$t_{1/2}$ 0-2, $\infty$ %dose/L•d	$t_{1/2}$ 0-4 %dose/L•d	$t_{1/2}$ 0-4, $\infty$ %dose/L•d	$t_{1/2}$ 0-5 %dose/L•d	$t_{1/2}$ 0-5, $\infty$ %dose/L•d	$t_{1/2}$ 0-70 %dose/L•d	$t_{1/2}$ 0-70, $\infty$ %dose/L•d	$t_{1/2}$ 0-460 %dose/L•d	$t_{1/2}$ 0-460, $\infty$ %dose/L•d
2, F	9.84	17.4	14.5	18.6	15.9	20.4	27.1	29.7	42.4	46.3
3, F	7.85	13.2	10.1	14.3	12.8	15.3	-	-	-	-
4, M	5.50	8.78	8.17	11.0	8.97	11.1	16.6	17.9	30.7	34.0
5, M	5.38	10.2	8.27	10.7	9.14	11.6	16.8	20.3	27.6	31.1
6, F	13.2	22.9	17.3	22.9	19.1	25.1	35.5	41.5	58.5	69.1
7, M	9.57	24.7	13.2	17.2	14.7	18.4	30.6	31.7	43.1	46.1
8, M	6.48	14.1	8.73	11.7	9.64	11.9	18.1	20.6	29.6	31.0
9, M	9.57	17.5	12.7	17.1	14.1	17.3	24.2	29.5	35.4	35.6
10, M	7.92	19.3	10.6	14.1	11.8	15.6	21.8	25.3	33.7	38.6
11, F	6.41	9.29	7.93	9.26	8.54	10.2	14.0	16.5	24.5	36.1
12, F	10.4	20.5	13.7	17.5	15.1	18.5	26.5	30.5	41.7	45.7
13, F	13.3	27.8	17.7	24.9	19.7	27.5	35.5	40.2	-	-
$\bar{x} \pm SD^1$	8.78 $\pm$ 2.68	17.1 $\pm$ 6.0	11.9 $\pm$ 3.3	15.8 $\pm$ 4.7	13.3 $\pm$ 3.7	16.9 $\pm$ 5.3	24.2 $\pm$ 7.5	27.6 $\pm$ 8.4	36.7 $\pm$ 9.5	41.6 $\pm$ 10.7

  

RBC										
ID, sex	0-2 d		0-4 d		0-5 d		0-70 d		0-460 d	
	$t_{1/2}$ 0-2 %dose/L•d	$t_{1/2}$ 0-2, $\infty$ %dose/L•d	$t_{1/2}$ 0-4 %dose/L•d	$t_{1/2}$ 0-4, $\infty$ %dose/L•d	$t_{1/2}$ 0-5 %dose/L•d	$t_{1/2}$ 0-5, $\infty$ %dose/L•d	$t_{1/2}$ 0-70 %dose/L•d	$t_{1/2}$ 0-70, $\infty$ %dose/L•d	$t_{1/2}$ 0-460 %dose/L•d	$t_{1/2}$ 0-460, $\infty$ %dose/L•d
2, F	2.68	1.93	4.92	6.75	6.34	8.06	17.6	21.5	70.0	140
3, F	2.37	5.78	3.38	5.36	4.39	4.94	-	-	-	-
4, M	2.23	4.20	3.09	5.96	4.25	5.28	14.9	19.8	40.2	46.1
5, M	2.37	5.34	4.02	6.20	4.68	6.30	18.0	20.2	43.2	56.2
6, F	3.15	9.57	4.45	6.94	5.17	6.47	19.4	61.8	78.0	154
7, M	2.71	5.26	3.61	5.05	4.13	5.67	14.3	35.5	44.7	58.4
8, M	1.15	3.11	1.93	3.95	2.30	3.23	-	-	10.8	14.7
9, M	2.44	5.81	3.64	4.52	3.83	4.79	7.82	8.19	13.0	13.8
10, M	2.72	8.89	3.72	5.37	4.25	5.50	13.3	51.2	41.7	58.8
11, F	1.97	4.49	2.27	3.40	2.92	3.47	9.84	35.7	30.3	39.7
12, F	2.66	5.78	3.71	5.70	4.32	6.50	16.42	55.1	52.3	56.9
13, F	3.45	6.04	4.65	6.04	5.27	6.50	14.56	19.7	-	-
$\bar{x} \pm SD^1$	2.49 $\pm$ 0.58	5.52 $\pm$ 2.04	3.62 $\pm$ 0.85	5.44 $\pm$ 1.03	4.32 $\pm$ 1.01	5.56 $\pm$ 1.30	14.6 $\pm$ 3.6	32.9 $\pm$ 18.0	42.4 $\pm$ 21.5	63.8 $\pm$ 47.0

<sup>1</sup>Data are presented as mean  $\pm$  SD

## Online Supplemental Material

### Supplemental TABLE 6 Effects of study duration on plasma and red blood cell RRR- $\alpha$ -tocopherol half-lives<sup>1</sup>

ID, sex	Plasma									
	0-2 d		0-4 d		0-5 d		0-70 d		0-460 d	
	$t_{1/2} 0-2$ <i>d</i>	$t_{1/2} 0-2, \infty$ <i>d</i>	$t_{1/2} 0-4$ <i>d</i>	$t_{1/2} 0-4, \infty$ <i>d</i>	$t_{1/2} 0-5$ <i>d</i>	$t_{1/2} 0-5, \infty$ <i>d</i>	$t_{1/2} 0-70$ <i>d</i>	$t_{1/2} 0-70, \infty$ <i>d</i>	$t_{1/2} 0-460$ <i>d</i>	$t_{1/2} 0-460, \infty$ <i>d</i>
2, F	0.67	1.67	1.09	1.84	1.27	2.31	6.68	12.9	39.5	80.8
3, F	0.68	1.53	0.91	1.74	1.26	1.92	-	-	-	-
4, M	0.68	1.42	1.11	2.07	1.29	2.11	8.28	12.4	56.6	129
5, M	0.73	1.80	1.16	1.94	1.35	2.31	7.55	24.3	46.7	102
6, F	0.80	1.98	1.13	1.99	1.32	2.46	7.95	20.7	51.4	129
7, M	0.86	3.31	1.22	1.95	1.41	2.23	8.02	9.75	34.5	64.4
8, M	0.86	2.71	1.20	2.08	1.38	2.16	7.38	15.8	34.5	52.7
9, M	0.83	2.10	1.17	2.06	1.35	2.11	7.04	26.8	23.4	26.0
10, M	0.85	3.17	1.19	2.06	1.37	2.54	7.49	20.8	45.5	106
11, F	0.73	1.44	1.01	1.45	1.16	1.87	7.44	21.4	65.3	273
12, F	0.83	2.37	1.15	1.87	1.33	2.12	7.45	19.3	43.0	84.3
13, F	0.80	2.67	1.15	2.27	1.35	2.80	6.76	17.6	-	-
$\bar{x} \pm SD^1$	$0.78 \pm 0.07$	$2.18 \pm 0.66$	$1.12 \pm 0.09$	$1.95 \pm 0.21$	$1.32 \pm 0.07$	$2.24 \pm 0.26$	$7.46 \pm 0.50$	$18.3 \pm 5.2$	$44.0 \pm 12.0$	$105 \pm 67$
Priors <sup>(Ref)</sup>	-	$2.15 \pm 0.73^{(20)}$	-	$1.83 \pm 0.78^{(22)}$	-	-	-	-	-	-
	-	$1.79 \pm 0.88^{(21)}$	-	$3.36 \pm 0.80^{(23)}$	-	-	-	-	-	-

  

ID, sex	RBC									
	0-2 d		0-4 d		0-5 d		0-70 d		0-460 d	
	$t_{1/2} 0-2$ <i>d</i>	$t_{1/2} 0-2, \infty$ <i>d</i>	$t_{1/2} 0-4$ <i>d</i>	$t_{1/2} 0-4, \infty$ <i>d</i>	$t_{1/2} 0-5$ <i>d</i>	$t_{1/2} 0-5, \infty$ <i>d</i>	$t_{1/2} 0-70$ <i>d</i>	$t_{1/2} 0-70, \infty$ <i>d</i>	$t_{1/2} 0-460$ <i>d</i>	$t_{1/2} 0-460, \infty$ <i>d</i>
2, F	0.80	2.00	1.49	2.73	1.98	3.45	15.0	26.6	185	392
3, F	0.82	2.46	1.05	2.07	1.28	1.68	-	-	-	-
4, M	0.75	1.76	1.23	2.48	1.43	2.24	14.5	31.0	66.1	125
5, M	0.80	2.13	1.29	2.59	1.50	2.62	17.5	22.7	93.2	195
6, F	0.93	3.81	1.29	2.60	1.49	2.27	18.2	145	115	455
7, M	0.89	2.27	1.23	2.22	1.44	2.61	16.6	111	84.7	196
8, M	0.87	2.96	1.34	3.75	1.57	2.89	-	-	140	220
9, M	0.93	2.90	1.26	2.30	1.45	2.27	7.83	10.2	39.3	64
10, M	0.95	4.27	1.28	2.37	1.47	2.42	15.6	220	88.4	234
11, F	0.87	2.78	1.18	1.97	1.35	1.97	16.1	200	82.8	193
12, F	0.89	2.56	1.28	2.60	1.52	3.08	17.5	162	62.9	97
13, F	0.95	1.76	1.27	1.97	1.45	2.18	13.7	35.0	-	-
$\bar{x} \pm SD^1$	$0.87 \pm 0.07$	$2.64 \pm 0.78$	$1.26 \pm 0.10$	$2.47 \pm 0.46$	$1.50 \pm 0.17$	$2.48 \pm 0.49$	$15.2 \pm 3.0$	$96.2 \pm 80.6$	$95.7 \pm 41.9$	$217 \pm 123$
Priors <sup>(Ref)</sup>	-	$2.13 \pm 0.58^{(21)}$	-	$9.31 \pm 2.37^{(23)}$	-	-	-	-	-	-

<sup>1</sup>Data are presented as mean  $\pm$  SD