

Supplementary material

Supplementary Table 1 Erythrocyte fatty acid composition of diabetic individuals with impaired glucose tolerance¹

	Fatty acid	Controls (n = 42)		Individuals with IGT (n = 28)	
		%	-C=C-	%	-C=C-
PC	16:0	35.1	0	37.5	0
	18:0	11.3	0	11.7	0
	Total SFAs	46.4		49.2	
	18:1	17.8	17.8	19.1	19.1
	Total MUFAs	17.8		19.1	
	18:2 n-6	18.6	37.2	15.7	31.4
	20:4 n-6	5.3	21.2	4.7	18.8
	18:3 n-3	0.2	0.6	0.2	0.6
	20:5 n-3	1.0	5.0	0.6	3.0
	22:6 n-3	1.7	10.2	1.1	6.6
	Total PUFAs	26.8		22.3	
	Total	91.0		90.6	
	UI		92.0		79.5
PE	16:0	27.9	-	29.7	0
	18:0	10.3	-	10.8	0
	Total SFAs	38.4		40.5	
	18:1	27.5	27.5	30.1	30.1
	Total MUFAs	27.5		30.1	
	18:2 n-6	6.4	12.8	5.6	11.2
	20:4 n-6	19.8	79.2	17.5	70.0
	18:3 n-3	0.1	0.3	0.2	0.6
	20:5 n-3	2.2	11.0	1.4	7.0
	22:6 n-3	6.1	36.6	4.7	28.2
	Total PUFAs	34.6		29.4	
	Total	100.3		100.0	
	UI		167.4		147.1

¹Ex-post calculations performed by the author are based on the original data listed by Min *et al.*^[32]. IGT: Impaired glucose tolerance; PC: Phosphatidylcholine; PE: Phosphatidylethanolamine; SFA: Saturated fatty acid; MUFA: Mono-unsaturated fatty acid; PUFA: Poly-unsaturated fatty acid; UI: Unsaturation index.

Supplementary Table 2 Erythrocyte fatty acid composition of controls and individuals with gestational diabetes mellitus¹

Fatty acids	Phosphatidylcholine				Phosphatidylethanolamine			
	Control		GDM		Control		GDM	
	<i>n</i> = 61		<i>n</i> = 53		<i>n</i> = 61		<i>n</i> = 53	
	%	-C=C-	%	-C=C-	%	-C=C-	%	-C=C-
16:0	23.49	0	30.64	0	17.45	0	19.33	0
18:0	19.05	0	17.63	0	7.16	0	7.82	0
Total SFAs	42.54		48.27		24.61		27.15	
16:1	0.48	0.48	0.54	0.54	0.47	0.47	0.49	0.49
18:1	12.63	12.63	15.29	15.29	18.14	18.14	19.60	19.60
Total MUFAs	13.11		15.83		18.61		20.09	
20:3 n-9	0.20	0.60	0.11	0.33	0.11	0.33	0.18	0.54
18:2 n-6	13.32	26.64	13.80	27.60	5.05	10.10	5.05	10.10
20:3 n-6	2.22	6.66	1.72	5.16	1.11	3.33	0.84	2.52
20:4 n-6	10.74	42.96	8.35	33.40	14.97	59.88	13.69	54.76
22:4 n-6	1.33	5.32	0.83	3.32	4.20	16.80	3.70	14.80
22:5 n-6	0.63	3.15	0.60	3.00	0.97	4.85	0.95	4.75
18:3 n-3	0.18	0.54	0.15	0.45	0.21	0.63	0.24	0.72
20:5 n-3	0.61	3.05	0.36	1.80	0.92	4.60	0.79	3.95
22:5 n-3	1.64	8.20	0.89	4.45	2.98	14.90	2.41	12.05
22:6 n-3	6.31	37.86	3.25	19.50	7.27	43.62	5.86	35.16
Total PUFAs	37.18		30.06		37.79		33.71	
Total	92.83		94.16		81.01		80.95	
UI		148.09		114.84		177.65		159.44

¹Ex-post calculations performed by the author are based on the original data listed by Min *et al*^[33]. SFA: saturated fatty acid; MUFA: mono-unsaturated fatty acid; PUFA: poly-unsaturated fatty acid; UI: unsaturation index.

Supplementary Table 3 Fatty acid composition (% of total fatty acids) of membrane phospholipids in fathead minnow muscle under different temperature conditions¹

Fatty acid	15 °C		25 °C		30 °C	
	(%)	-C=C- (n)	(%)	-C=C- (n)	(%)	-C=C- (n)
14:0	0.04	0	0.02	0	0.1	0
16:0	12.8	0	14.2	0	30.0	0
17:0	0.1	0	0.2	0	0.1	0
18:0	4.8	0	5.3	0	6.9	0
24:0	0.1	0	0.2	0	1.3	0
Total SFAs	17.8		19.92		38.4	
15:1	1.8	1.8	1.0	1.0	0.1	0.1
16:1 n-7	0.4	0.4	0.3	0.3	0.3	0.3
17:1 n-9	1.0	1.0	0.7	0.7	2.4	2.4
18:1 n-7	2.6	2.6	2.2	2.2	6.1	6.1
18:1 n-9	9.6	9.6	10.9	10.9	14.3	14.3
20:1 n-9	0.5	0.5	0.4	0.4	2.4	2.4
24:1 n-9	0.2	0.2	0.6	0.6	1.0	1.0
Total MUFAs	16.1		16.1		26.6	
18:2 n-6	5.8	11.6	7.3	14.6	5.7	11.4
20:2 n-6	0.9	1.8	0.7	1.4	0.1	0.2
18:3 n-6	0.0	0.0	0.1	0.3	1.5	4.5
18:3 n-3	0.1	0.3	0.1	0.3	0.1	0.3
20:3 n-6	1.8	5.4	0.9	2.7	0.0	0.0
18:4 n-3	0.0	0.0	0.0	0.0	0.1	0.4
20:4 n-6	6.1	24.4	5.8	23.2	4.5	18.0
20:4 n-3	1.1	4.4	0.3	1.2	0.2	0.8
22:4 n-6	1.7	6.8	0.7	2.8	1.7	6.8
20:5 n-3	8.7	43.5	7.9	39.5	5.1	25.5
22:5 n-3	3.2	16.0	2.4	12.0	0.0	0.0
22:6 n-3	36.6	219.6	35.3	211.8	15.9	95.4
Total PUFAs	66.0		61.5		34.9	
Total	99.9		97.5		99.9	
UI		349.9		325.9		189.9

¹Ex-post calculations performed by the author are based on the original data listed by Fadhlouli *et al*^[60]. SFA: Saturated fatty acid; MUFA: Mono-unsaturated fatty acid; PUFA: Poly-unsaturated fatty acid; UI: Unsaturation index.

Supplementary Table 4 Unsaturation index of non-esterified fatty acids released from human white fat cells, and human serum lipids of healthy subjects¹

Fatty acid	Released from white fatt cells ²		Serum lipids ³	
	mol% of total fatty acids	total number of double bonds	mol% of total fatty acids	total number of double bonds
C12:0	0.61	0		
C14:0	3.51	0		
C15:0	0.40	0		
C16:0	24.97	0		
C18:0	6.14	0		
C20:0	0.08	0		
C22:0	0.02	0		
Total SFAs	35.73		27.05	
C14:1	0.26	0.26		
C16:1	4.40	4.40		
C17:1	0.36	0.36		
C18:1	40.70	40.70		
C20:1 n-9	0.58	0.58		
C22:1 n-9	0.03	0.03		
Total MUFAs	46.33	46.33	23.60	23.60
C18:2 n-6	15.74	31.48	27.47	54.94
C20:2 n-9	0.02	0.03		
C20:2 n-6	0.23	0.46		
C18.3 n-3	0.73	2.20	2.48	7.44
C18:3 n-6	0.05	0.15		
C20:3 n-6	0.21	0.64		
C20:3 n-3	0.03	0.08		
C20:4 n-6	0.51	2.04	4.48	17.92
C20:4 n-3	0.04	0.14		
C22:4 n-6	0.08	0.33		
C20:5 n-3	0.09	0.45	1.56	7.80
C22:5 n-6	0.01	0.04		
C22:5 n-3	0.09	0.45		
C22:6 n-3	0.12	0.70	13.36	80.16
Total PUFAs	17.95	39.20	49.55	168.26
Total	100.01		100.00	
UI		85.53		191.86

¹Ex-post calculations performed by the author. For the conversion to mol%, the values of the data published by Raclot *et al*^[69] were multiplied by 0.272², and those by Wang *et al*^[70] by 0.142³. The unsaturation index was calculated as the mean number of cis double bonds per fatty-acid residue multiplied by 100. SFA: Saturated fatty acid; MUFA, monounsaturated fatty acid; PUFA, polyunsaturated fatty acid.

Supplementary Table 5 Erythrocyte fatty acid composition of controls and diabetic patients without diabetic retinopathy¹

Fatty acid	Controls		Diabetic individuals without DR	
	<i>n</i> = 18		<i>n</i> = 14	
	(%)	-C=C- (<i>n</i>)	%	-C=C- (<i>n</i>)
14:0	0.43	0	0.48	0
15:0	0.17	0	0.22	0
16:0	22.41	0	23.75	0
17:0	0.38	0	0.44	0
18:0	17.22	0	17.72	0
18:1 (trans)	0.22	-	0.20	-
20:0	0.15	0	0.18	0
22:0	0.33	0	0.42	0
24:0	0.74	0	0.78	0
Total SFAs	42.05		44.19	
16:1	0.73	0.73	1.03	1.03
18:1	17.16	17.16	19.15	19.15
20:1 n-9	0.21	0.21	0.26	0.26
22:1 n-9	0.06	0.06	0.09	0.09
24:1 n-9	0.69	0.69	1.15	1.15
Total MUFAs	18.85		21.68	
20:3 n-9	0.19	0.57	0.2	0.6
18:2 n-6	12.87	25.74	10.58	21.16
18:3 n-6	0.09	0.27	0.12	0.36
20:2 n-6	0.20	0.40	0.23	0.46
20:3 n-6	1.30	3.90	1.50	4.50
20:4 n-6	13.04	52.16	11.33	45.32
22:4 n-6	2.00	8.00	2.01	8.04
22:5 n-6	0.35	1.75	0.30	1.50
18:3 n-3	0.22	0.66	0.21	0.63
20:5 n-3	0.97	4.85	1.03	5.15
22:5 n-3	2.23	11.15	1.56	7.80
22:6 n-3	4.51	27.06	2.85	17.10
Total PUFAs	37.97		31.92	
Total	98.87		97.79	
UI		155.36		134.30

¹Ex-post calculations performed by the author are based on the original data listed by Koehrer *et al*^[83]. Lipid extraction from erythrocytes and fatty acid analysis by gas chromatography were performed as described by Koehrer *et al*^[83]. To obtain the UI, starts with the multiplication of the percentage of each fatty acid percentage (row 2) by its number of carbon-carbon double bonds. Summarizing the obtained multiplication values (row 3) yields the UI. DR: Diabetic retinopathy; SFA: Saturated fatty acid; MUFA: Mono-unsaturated fatty acid; PUFA: Poly-unsaturated fatty acid; UI: Unsaturation index.

Supplementary Table 6 Erythrocyte fatty acid composition of diabetic individuals with diabetic retinopathy¹

Fatty acid	Diabetic individuals with mild DR		Diabetic individuals with moderate DR		Diabetic individuals with severe DR	
	<i>n</i> = 12		<i>n</i> = 12		<i>n</i> = 22	
	%	-C=C-	%	-C=C-	%	-C=C-
14:0	0.73	0	0.64	0	0.85	0
15:0	0.19	0	0.22	0	0.22	0
16:0	25.28	0	25.80	0	25.08	0
17:0	0.35	0	0.45	0	0.48	0
18:0	16.43	0	18.81	0	17.17	0
18:1 (trans)	0.23	-	0.31	-	0.39	-
20:0	0.21	0	0.26	0	0.32	0
22:0	0.46	0	0.76	0	0.78	0
24:0	0.94	0	1.75	0	1.66	0
Total SFA	44.82		49.00		46.95	
16:1	0.98	0.98	0.80	0.80	0.74	0.74
18:1	19.24	19.24	18.14	18.14	17.41	17.41
20:1 n-9	0.23	0.23	0.26	0.26	0.24	0.24
22:1 n-9	0.09	0.09	0.08	0.08	0.11	0.11
24:1 n-9	1.31	1.31	2.16	2.16	2.00	2.00
Total MUFAs	21.85		21.44		20.50	
20:3 n-9	0.18	0.54	0.20	0.60	0.15	0.45
18:2 n-6	11.30	22.60	0.15	20.30	10.61	21.22
18:3 n-6	0.12	0.36	0.09	0.27	0.10	0.30
20:2 n-6	0.25	0.50	0.20	0.40	0.28	0.56
20:3 n-6	1.31	3.93	1.26	3.78	1.27	3.81
20:4 n-6	9.33	37.32	9.93	39.72	9.90	39.60
22:4 n-6	1.82	7.28	1.69	6.76	1.79	7.16
22:5 n-6	0.34	1.70	0.36	1.80	0.35	1.75
18:3 n-3	0.27	0.81	0.23	0.69	0.22	0.66
20:5 n-3	0.93	4.65	0.70	3.50	0.94	4.70
22:5 n-3	1.67	8.35	1.15	5.75	1.49	7.45
22:6 n-3	2.67	16.02	2.41	14.46	2.75	16.50
Total PUFAs	30.19		28.37		29.85	
Total	96.86		98.81		97.30	
UI		125.91		119.47		124.66

¹Ex-post calculations performed by the author are based on the original data listed by Koehrer *et al* [83]. DR: Diabetic retinopathy; SFA: Saturated fatty acid; MUFA: Mono-unsaturated fatty acid; PUFA: Poly-unsaturated fatty acid; UI: Unsaturation index.