The following supplement accompanies the article

Feeding habits of a new Arctic predator: insight from full-depth blubber fatty acid signatures of Greenland, Faroe Islands, Denmark, and managed-care killer whales *Orcinus orca*

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Table S1. Mean (± SE) fatty acid profiles (mass % of total) for full depth blubber biopsies of 19 North Atlantic killer whales (fetuses excluded) from 2005–2014.

Fatty acid (**'dietary'**)	mean ± SE	Fatty acid (**'dietary'**)	mean ± SE
Saturated fatty acids (SFA)		*Polyunsaturated fatty acids (PUFA)*	
12:0	0.63 ± 0.05	**16:2n-6**	**0.10 ± 0.06**
13:0	0.06 ± 0.00	**16:2n-4**	**0.32 ± 0.01**
14:0	6.00 ± 0.28	**16:3n-6**	**0.55 ± 0.01**
iso15:0	0.87 ± 0.19	**16:3n-4**	**0.10 ± 0.01**
anti15:0	0.22 ± 0.05	**16:4n-3**	**0.15 ± 0.00**
15:0	0.84 ± 0.06	**16:4n-1**	**0.11 ± 0.01**
iso16:0	0.60 ± 0.21	18:2Δ5,11	0.06 ± 0.00
16:0	5.69 ± 0.20	18:2n-7	0.08 ± 0.01
7Me16:0	0.30 ± 0.01	**18:2n-6**	**1.69 ± 0.04**
iso17:0	0.09 ± 0.01	**18:2n-4**	**0.05 ± 0.00**
17:0	1.05 ± 0.21	**18:3n-6**	**0.04 ± 0.00**
18:0	0.96 ± 0.06	**18:3n-4**	**0.15 ± 0.01**
20:0	0.04 ± 0.00	**18:3n-3**	**4.60 ± 0.45**
Monounsaturated fatty acids (MFA)		**18:3n-1**	**1.05 ± 0.10**
14:1n-9	0.63 ± 0.05	**18:4n-3**	**0.44 ± 0.03**
14:1n-7	0.55 ± 0.06	**18:4n-1**	**0.09 ± 0.01**
14:1n-5	2.67 ± 0.14	20:2n-9	0.09 ± 0.01
15:1n-8	0.03 ± 0.00	**20:2n-6**	**0.12 ± 0.01**
15:1n-6	0.14 ± 0.01	**20:3n-6**	**0.05 ± 0.00**
16:1n-11	1.01 ± 0.06	**20:4n-6**	**0.21 ± 0.02**
16:1n-9	1.92 ± 0.16	**20:3n-3**	**0.17 ± 0.02**
16:1n-7	19.63 ± 0.70	**20:4n-3**	**0.29 ± 0.02**
16:1n-5	0.05 ± 0.00	**20:5n-3**	**2.85 ± 0.06**
17:1	0.46 ± 0.01	**21:5n-3**	**1.28 ± 0.13**
18:1n-11	5.04 ± 0.19	**22:4n-6**	**0.12 ± 0.01**
18:1n-9	22.23 ± 0.58	**22:5n-6**	**0.05 ± 0.00**
18:1n-7	3.06 ± 0.18	**22:4n-3**	**0.04 ± 0.00**
18:1n-5	0.29 ± 0.01	22:5n-3	0.98 ± 0.11
20:1n-11	**2.42 ± 0.17**	**22:6n-3**	**1.76 ± 0.21**
20:1n-9	**4.28 ± 0.26**		
20:1n-7	**0.17 ± 0.02**	∑SFA	17.8 ± 1.13
22:1n-11	**1.96 ± 0.29**	∑MUFA	67.2 ± 1.21
22:1n-9	**0.24 ± 0.02**	∑PUFA	14.7 ± 0.59
22:1n-7	**0.03 ± 0.00**	∑n-3 (omega-3)	9.56 ± 0.54
		∑n-6 (omega-6)	3.10 ± 0.07

Table S2. Mean (± SE) fatty acid profiles (mass % of total) for full depth blubber biopsies of 4 managed-care killer whales.

Fatty acid (**'dietary'**)	mean ± SE			Fatty acid (**'dietary'**)	mean ± SE		
Saturated fatty acids (SFA)				*Polyunsaturated fatty acids (PUFA)*			
12:0	0.85	±	0.14	**16:2n-6**	**0.09**	**±**	**0.00**
13:0	0.07	±	0.01	**16:2n-4**	**0.28**	**±**	**0.02**
14:0	6.01	±	0.24	**16:3n-6**	**0.53**	**±**	**0.03**
iso15:0	0.45	±	0.05	**16:3n-4**	**0.09**	**±**	**0.01**
anti15:0	0.22	±	0.03	**16:4n-3**	**0.11**	**±**	**0.01**
15:0	0.69	±	0.09	**16:4n-1**	**0.20**	**±**	**0.02**
iso16:0	0.28	±	0.05	18:2Δ5,11	0.03	±	0.00
16:0	6.39	±	0.36	18:2n-7	0.04	±	0.00
7Me16:0	0.24	±	0.01	**18:2n-6**	**2.33**	**±**	**0.89**
iso17:0	0.08	±	0.01	**18:2n-4**	**0.07**	**±**	**0.01**
17:0	0.14	±	0.02	**18:3n-6**	**0.10**	**±**	**0.01**
18:0	1.29	±	0.15	**18:3n-4**	**0.19**	**±**	**0.02**
20:0	0.07	±	0.01	**18:3n-3**	**3.59**	**±**	**0.72**
Monounsaturated fatty acids (MFA)				**18:3n-1**	**0.55**	**±**	**0.12**
14:1n-9	0.56	±	0.10	**18:4n-3**	**0.54**	**±**	**0.12**
14:1n-7	0.34	±	0.09	**18:4n-1**	**0.16**	**±**	**0.02**
14:1n-5	1.40	±	0.12	20:2n-9	0.09	±	0.00
15:1n-8	0.04	±	0.00	**20:2n-6**	**0.13**	**±**	**0.01**
15:1n-6	0.07	±	0.00	**20:3n-6**	**0.05**	**±**	**0.01**
16:1n-11	1.57	±	0.20	**20:4n-6**	**0.24**	**±**	**0.04**
16:1n-9	1.58	±	0.26	**20:3n-3**	**0.10**	**±**	**0.03**
16:1n-7	13.3	±	0.35	**20:4n-3**	**0.34**	**±**	**0.04**
16:1n-5	0.05	±	0.01	**20:5n-3**	**2.25**	**±**	**0.29**
17:1	0.40	±	0.02	**21:5n-3**	**0.14**	**±**	**0.02**
18:1n-11	7.29	±	0.06	**22:4n-6**	**0.12**	**±**	**0.02**
18:1n-9	17.74	±	0.63	**22:5n-6**	**0.09**	**±**	**0.02**
18:1n-7	2.38	±	0.14	**22:4n-3**	**0.04**	**±**	**0.00**
18:1n-5	0.36	±	0.02	22:5n-3	1.53	±	0.30
20:1n-11	**4.63**	**±**	**0.43**	**22:6n-3**	**3.87**	**±**	**0.59**
20:1n-9	**6.37**	**±**	**0.28**				
20:1n-7	**0.30**	**±**	**0.02**	∑SFA	17.8	±	0.69
22:1n-11	**5.46**	**±**	**0.13**	∑MUFA	65.4	±	1.31
22:1n-9	**0.52**	**±**	**0.02**	∑PUFA	17.5	±	0.72
22:1n-7	**0.07**	**±**	**0.00**	∑n-3 (omega-3)	12.2	±	0.73
				∑n-6 (omega-6)	3.73	±	0.85

Table S3. Mean (±SE) proportion of fatty acids (mass % of total) found to have significant differences over layers from MANOVA for **A)** Managed-care and **B)** wild killer whales.

A	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7	Layer 8	Layer 9	Layer 10
14:00	6.08(±0.39)^{a}	6.59(±0.40)^{a}	6.8(±0.55)^{a}	6.76(±0.70)^{a}	6.45(±0.51)^{a}	6.04(±0.18)^{a}	5.56(±0.16)^{a}	5.00(±0.24)^{a}	4.79(±0.35)^{a}	5.15(±0.25)^{a}
14:1n5	0.34(±0.09)^{a}	0.47(±0.14)^{a}	0.7(±0.16) ^{a}	1.03(±0.12)^{b}	1.73(±0.19)^{bc}	1.96(±0.19)^{bc}	2.22(±0.24)^{bc}	2.47(±0.32)^{bc}	2.79(±0.40)^{c}	2.76(±0.60)^{c}
16:00	6.40(±0.86)^{a}	6.37(±0.33)^{a}	6.25(±0.34) ^{a}	5.99(±0.52)^{a}	5.79(±0.72)^{a}	5.53(±0.83)^{a}	5.29(±0.84)^{a}	5.20(±0.78)^{a}	5.13(±0.53)^{a}	5.26(±0.06)^{a}
16:1n11	0.78(±0.08)^{a}	0.73(±0.08)^{a}	0.82(±0.11)^{ab}	0.95(±0.13)^{abc}	1.06(±0.18)^{bc}	1.13(±0.19)^{bc}	1.15(±0.31)^{c}	1.13(±0.38)^{c}	1.11(±0.37)^{bc}	1.05(±0.25)^{bc}
16:1n9	0.89(±0.18)^{a}	1.05(±0.15)^{a}	1.25(±0.14)^{a}	1.47(±0.19)^{a}	1.92(±0.26)^{a}	2.02(±0.30)^{a}	2.15(±0.39)^{a}	2.11(±0.47)^{a}	2.03(±0.48)^{a}	1.82(±0.41)^{a}
16:1n7	7.13(±0.32)^{a}	8.47(±0.78)^{a}	10.14(±0.92)^{b}	12.13(±0.85)^{bc}	15.48(±0.84)^{cd}	16.41(±0.65)^{d}	17.67(±0.77)^{d}	18.26(±1.01)^{d}	18.77(±1.13)^{d}	18.29(±1.46)^{d}
18:1n9	13.91(±0.49)^{a}	15.25(±0.83)^{ab}	16.35(±0.69)^{abc}	18.43(±1.13)^{bcd}	18.74(±0.75)^{cd}	18.86(±0.66)^{cd}	19.67(±0.82)^{cd}	20.19(±0.82)^{d}	20.42(±0.73)^{d}	20.20(±0.62)^{d}
18:3n3	0.90(±0.08)^{a}	1.03(±0.13)^{ab}	1.49(±0.22)^{ab}	2.40(±0.56)^{bc}	3.85(±0.74)^{cd}	4.89(±1.07)^{cd}	6.82(±1.06)^{d}	7.18(±1.34)^{d}	6.08(±1.26)^{d}	4.61(±0.59)^{cd}
20:1n11	6.30(±0.50)^{d}	6.03(±0.52)^{cd}	5.47(±0.52)^{bcd}	5.17(±0.65)^{abcd}	3.93(±0.39)^{abcd}	3.58(±0.27)^{ab}	3.26(±0.23)^{a}	3.49(±0.38)^{ab}	4.00(±0.05)^{abc}	4.43(±0.48)^{abcd}
20:1n9	9.82(±0.56)^{a}	9.14(±0.62)^{ab}	8.27(±0.48)^{ab}	7.23(±0.37)^{abc}	5.66(±0.19)^{bcd}	4.96(±0.37)^{cde}	3.64(±0.21)^{de}	3.29(±0.48)^{e}	3.66(±0.74)^{de}	4.28(±0.54)^{de}
22:1n11	10.61(±1.06)^{a}	8.97(±0.93)^{ab}	7.22(±0.60)^{ab}	5.26(±0.72)^{bc}	4.04(±0.24)^{cd}	3.48(±0.03)^{cd}	2.68(±0.23)^{d}	2.54(±0.37)^{d}	2.98(±0.49)^{d}	3.68(±0.43)^{cd}
22:6n3	6.48(±0.43)^{a}	6.05(±0.49)^{ab}	5.35(±0.56)^{ab}	4.67(±0.60)^{ab}	3.06(±0.27)^{bc}	2.45(±0.29)^{cd}	1.50(±0.18)^{cd}	1.30(±0.27)^{d}	1.32(±0.32)^{d}	1.63(±0.38)^{cd}
Avg. Blubber depth(mm)	53.3(±0.5)	48.0(±0.5)	42.6(±0.5)	37.3(±0.5)	32.0(±0.5)	26.7(±0.5)	21.3(±0.5)	16.0(±0.5)	10.7(±0.5)	5.3(±0.5)
Range(mm)	45.0-60.0	40.5-54.0	36.0-48.0	31.5-42.0	27.0-36.0	22.5-30.0	18.0-24.0	13.5-18.0	9.0-12.0	4.5-6.0

B	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7	Layer 8	Layer 9	Layer 10
14:00	6.30(±0.38)^{a}	6.46(±0.40)^{a}	6.47(±0.35)^{a}	6.44(±0.32)^{a}	6.29(±0.31)^{a}	6.00(±0.30)^{a}	5.71(±0.30)^{a}	5.39(±0.22)^{a}	5.28(±0.24)^{a}	5.54(±0.22)^{a}
14:1n5	1.74(±0.23)^{a}	1.87(±0.24)^{ab}	2.06(±0.23)^{abc}	2.34(±0.21)^{bcd}	2.60(±0.18)^{cde}	2.83(±0.15)^{def}	3.13(±0.11)^{def}	3.32(±0.09)^{ef}	3.45(±0.12)^{ef}	3.64(±0.12)^{f}
16:1n11	0.70(±0.09)^{ab}	0.73(±0.08)^{ab}	0.82(±0.07)^{ab}	0.95(±0.07)^{ab}	1.06(±0.07)^{a}	1.13(±0.07)^{ab}	1.15(±0.07)^{ab}	1.13(±0.07)^{ab}	1.11(±0.06)^{b}	1.05(±0.05)^{ab}
18:1n9	20.59(±0.82)^{a}	21.04(±0.81)^{ab}	21.52(±0.75)^{ab}	22.01(±0.72)^{ab}	22.49(±0.67)^{ab}	22.45(±0.53)^{ab}	22.50(±0.53)^{ab}	22.68(±0.53)^{ab}	23.46(±0.50)^{ab}	23.80(±0.59)^{b}
18:3n3	2.81(±0.74)^{a}	2.95(±0.70)^{a}	3.28(±0.58)^{ab}	3.87(±0.52)^{abc}	4.52(±0.42)^{bc}	5.46(±0.54)^{c}	6.03(±0.72)^{c}	5.75(±0.82)^{bc}	4.80(±0.69)^{bc}	3.95(±0.58)^{abc}
20:1n9	6.92(±0.74)^{a}	6.40(±0.67)^{ab}	5.63(±0.58)^{abc}	4.65(±0.44)^{abc}	3.87(±0.34)^{abc}	3.35(±0.26)^{abc}	3.06(±0.24)^{c}	3.24(±0.28)^{bc}	3.53(±0.27)^{abc}	3.49(±0.25)^{abc}
20:5n3	2.17(±0.31)^{a}	1.95(±0.29)^{a}	1.61(±0.25)^{a}	1.16(±0.19)^{a}	0.81(±0.14)^{a}	0.59(±0.09)^{a}	0.47(±0.08)^{a}	0.50(±0.10)^{a}	0.50(±0.10)^{a}	0.55(±0.08)^{a}
22:1n11	3.9(±0.92)^{a}	3.21(±0.59)^{ab}	2.61(±0.41)^{abc}	1.98(±0.27)^{abc}	1.61(±0.22)^{abc}	1.41(±0.19)^{bc}	1.33(±0.19)^{c}	1.43(±0.20)^{bc}	1.54(±0.19)^{abc}	1.61(±0.19)^{abc}
22:6n3	4.21(±0.59)^{a}	3.85(±0.57)^{ab}	3.1(±0.51)^{ab}	2.20(±0.40)^{abc}	1.44(±0.27)^{bcd}	0.94(±0.15)^{cd}	0.68(±0.10)^{d}	0.70(±0.11)^{d}	0.75(±0.11)^{cd}	0.89(±0.12)^{cd}
Avg. Blubber depth(mm)	36.8(±0.3)	33.1(±0.3)	29.5(±0.3)	25.8(±0.3)	22.1(±0.3)	18.4(±0.3)	14.7(±0.3)	11.1(±0.3)	7.4(±0.3)	3.7(±0.3)
Range(mm)	15.0-55.0	13.5-49.5	12.0-44.0	10.5-38.5	9.0-33.0	7.5-27.5	6.0-22.0	4.5-16.5	3.0-11.0	1.5-5.5

Shared superscript letters among rows signify that the proportion of the fatty acid was not significantly different between those layers ($p > 0.05$).
Dietary fatty acids are bolded

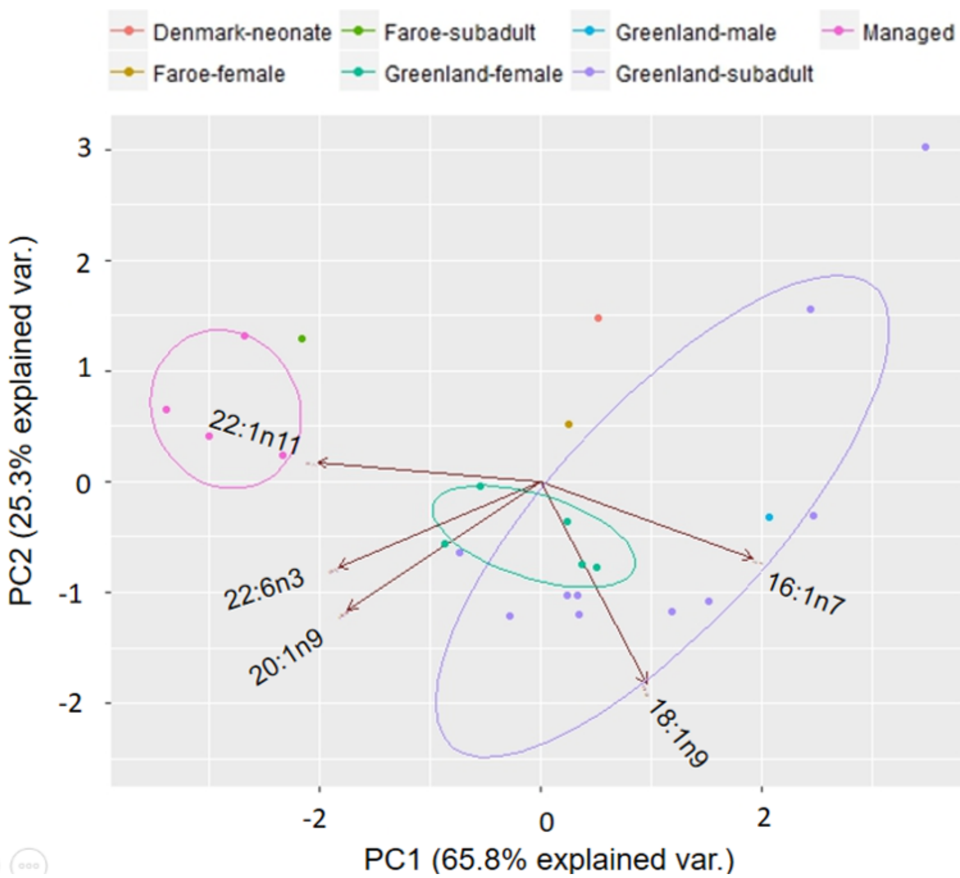
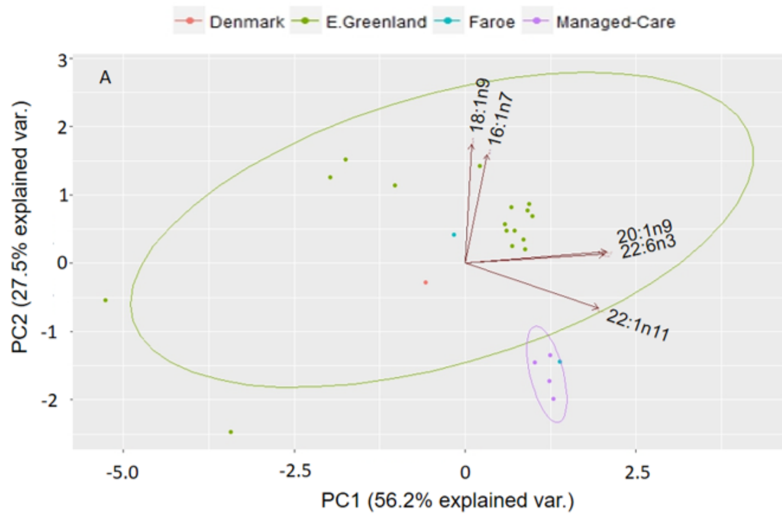
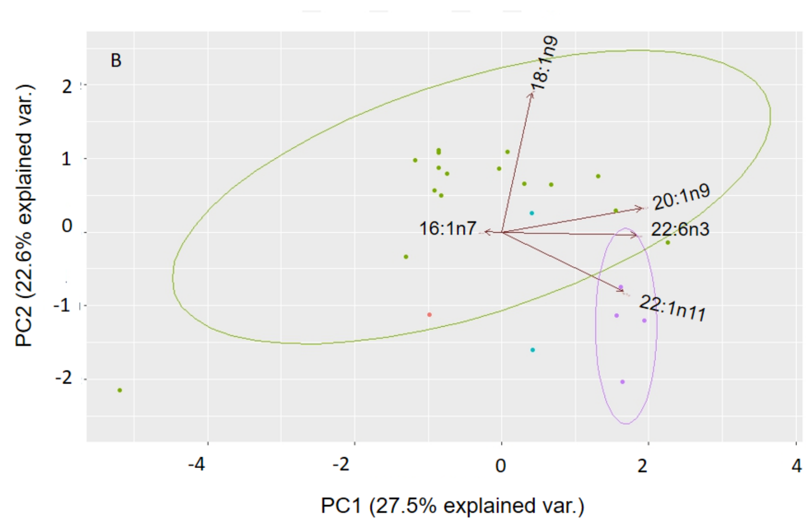


Figure S1. Loading plot from the principal component analysis (PCA) of fatty acid signatures in full-depth blubber of killer whales by demographic group. Samples include one Denmark neonate (orange), one Faroe Island adult female (yellow), one Faroe Island sub-adult (green), six Greenland adult females (teal), one Greenland adult male (blue), nine Greenland sub-adults (purple), and four fish-fed, managed-care killer whales (pink). Eigenvectors of the five fatty acids used in the PCA are shown with brown arrows. Ellipses show 95% confidence intervals around the Greenland adult females (teal), Greenland sub-adults (purple), and managed-care (pink) groups. Samples closer together in the PCA show more similar fatty acid profiles. PC1 and PC2 (displayed) explained 91.1% of the variance.





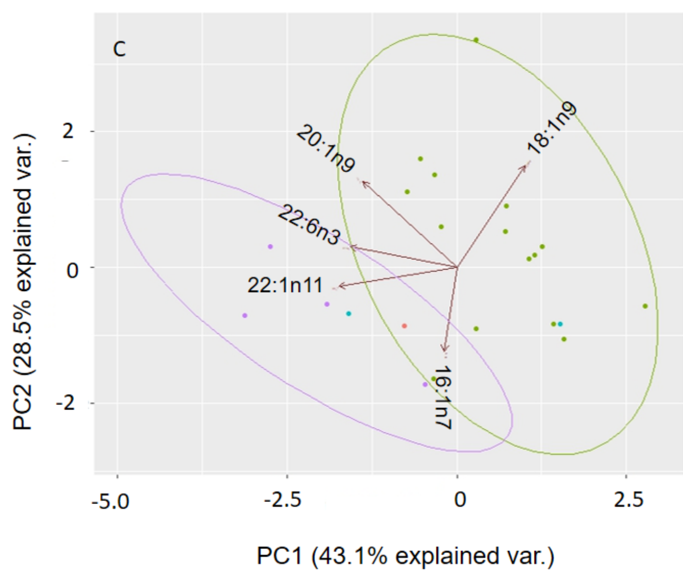


Figure S2. Principal component analysis (PCA) of fatty acid signatures in **A)** layer 1, **B)** layer 5, and **C)** layer 10 of 19 North Atlantic killer whales sampled from 2005-2014 (16 from Greenland in green, one from Denmark in pink, two from the Faroe Islands in blue) and four fish-fed, managed-care killer whales (in purple). Eigenvectors of the five fatty acids used in the PCA are shown in brown. Ellipses show 95% confidence intervals around the Greenland (green) and managed-care (purple) whales. Samples closer together in the PCA show more similar fatty acid profiles. (Different axes)