Supplementary Material

Table S1. Pairwise comparisons of baseline corrected trophic amino acid stable isotope values ($\delta^{15}N_{trophic\text{-}Phe}$) between zooplankton, pelagic fish, Atlantic cod and harp seals.

Trophic guild comparison	Difference	SE	df	t-ratio	p
Zooplankton vs. Pelagic fish	–2.205	0.574	67	–3.84	<0.001
Zooplankton vs. Atlantic cod	–5.812	0.91	67	–6.39	<0.001
Zooplankton vs. Harp seal	–0.348	0.729	67	–0.477	0.964
Pelagic fish vs. Atlantic cod	–3.608	0.827	67	–4.361	<0.001
Pelagic fish vs. Harp seal	1.857	0.624	67	2.978	0.021
Atlantic cod vs. Harp seal	5.464	0.941	67	5.804	<0.001

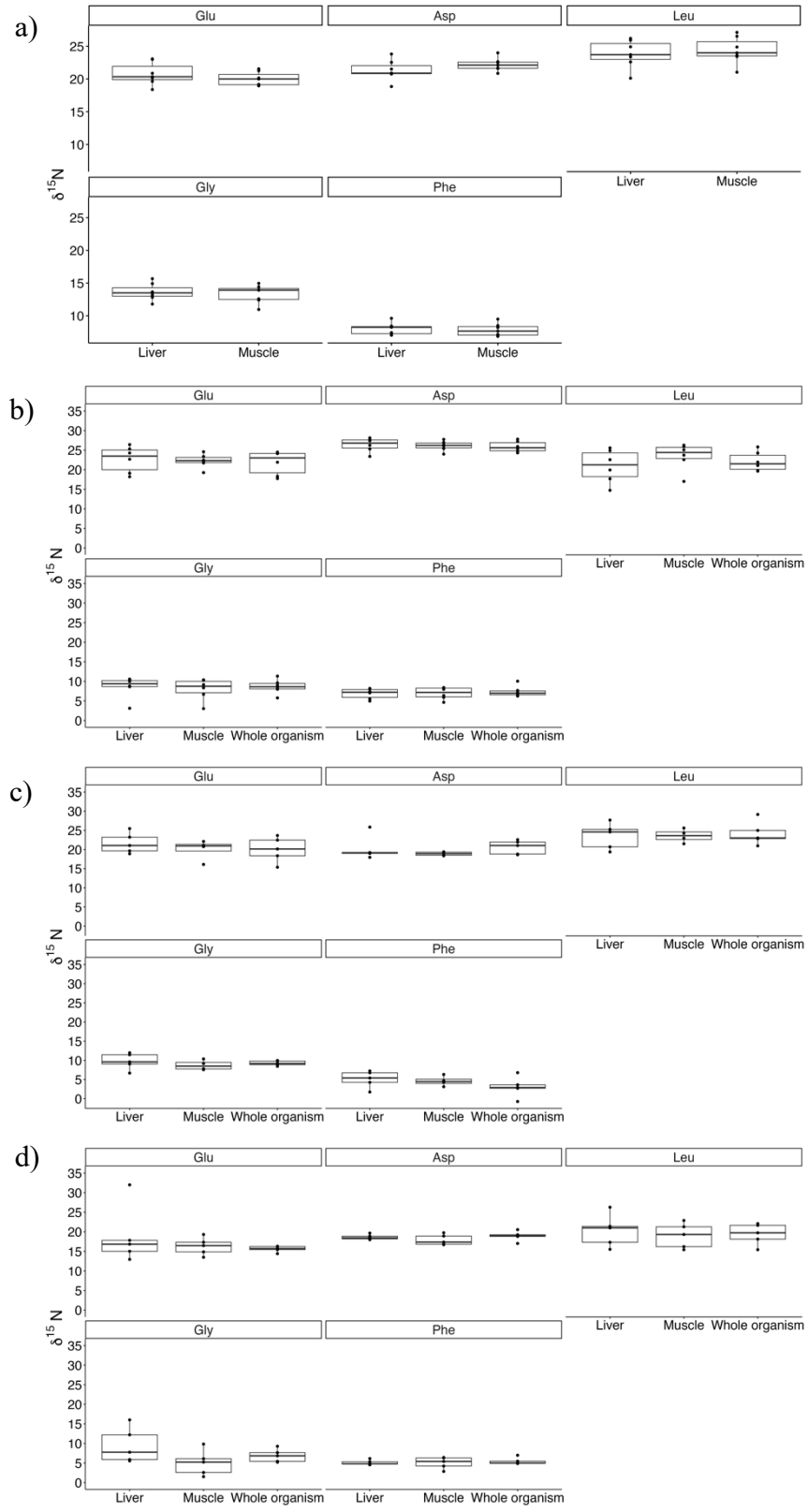

Fig. S1. Amino acid δ^{15}N values for different tissues in a) Harp seals, b) Atlantic cod, c) Arctic cod and d) capelin. Amino acids include glutamic acid (Glu), aspartic acid (Asp), leucine (Leu), glycine (Gly) and phenylalanine (Phe). In each box, the horizontal line represents the median, the box spans 50% of the data (interquartile range), whiskers define the upper and lower data range (excluding outliers), and dots represent outliers.

Table S2. A comparison of linear models (Eq. 4) with and without an interaction term for tissue type (muscle, liver and homogenised whole-organism). Linear models were run separately for four different species and for each trophic amino acid: glutamic acid (Glu), aspartic acid (Asp) and Leucine (Leu).

Species	**AA**	**Linear model setup**	**Model comparison — ANOVA (Type I)**				**No. of ind.**
			SS	**df**	***F***	**Sig.**	
Harp seal	Glu	$\Delta\delta^{15}N_{Glu–phe} \sim (TP - 1)$	1.279	1	0.890	0.364	7
		$\Delta\delta^{15}N_{Glu–phe} \sim (TP - 1) : tissue$					
	Asp	$\Delta\delta^{15}N_{Asp–phe} \sim (TP - 1)$	3.909	1	2.346	0.152	7
		$\Delta\delta^{15}N_{Asp–phe} \sim (TP - 1) : tissue$					
	Leu	$\Delta\delta^{15}N_{Leu–phe} \sim (TP - 1)$	1.989	1	0.555	0.471	7
		$\Delta\delta^{15}N_{Leu–phe} \sim (TP - 1) : tissue$					
Atlantic cod	Glu	$\Delta\delta^{15}N_{Glu–phe} \sim (TP - 1)$	6.579	2	0.322	0.729	6
		$\Delta\delta^{15}N_{Glu–phe} \sim (TP - 1) : tissue$					
	Asp	$\Delta\delta^{15}N_{Asp–phe} \sim (TP - 1)$	3.560	2	0.350	0.710	6
		$\Delta\delta^{15}N_{Asp–phe} \sim (TP - 1) : tissue$					
	Leu	$\Delta\delta^{15}N_{Leu–phe} \sim (TP - 1)$	18.551	2	0.738	0.495	6
		$\Delta\delta^{15}N_{Leu–phe} \sim (TP - 1) : tissue$					
Arctic cod	Glu	$\Delta\delta^{15}N_{Glu–phe} \sim (TP - 1)$	4.323	2	0.150	0.863	5
		$\Delta\delta^{15}N_{Glu–phe} \sim (TP - 1) : tissue$					
	Asp	$\Delta\delta^{15}N_{Asp–phe} \sim (TP - 1)$	23.560	2	1.598	0.246	5
		$\Delta\delta^{15}N_{Asp–phe} \sim (TP - 1) : tissue$					
	Leu	$\Delta\delta^{15}N_{Leu–phe} \sim (TP - 1)$	19.332	2	0.680	0.527	5
		$\Delta\delta^{15}N_{Leu–phe} \sim (TP - 1) : tissue$					
Capelin	Glu	$\Delta\delta^{15}N_{Glu–phe} \sim (TP - 1)$	34.985	2	0.746	0.495	5
		$\Delta\delta^{15}N_{Glu–phe} \sim (TP - 1) : tissue$					
	Asp	$\Delta\delta^{15}N_{Asp–phe} \sim (TP - 1)$	1.247	2	0.444	0.652	5
		$\Delta\delta^{15}N_{Asp–phe} \sim (TP - 1) : tissue$					
	Leu	$\Delta\delta^{15}N_{Leu–phe} \sim (TP - 1)$	4.997	2	0.233	0.795	5
		$\Delta\delta^{15}N_{Leu–phe} \sim (TP - 1) : tissue$					

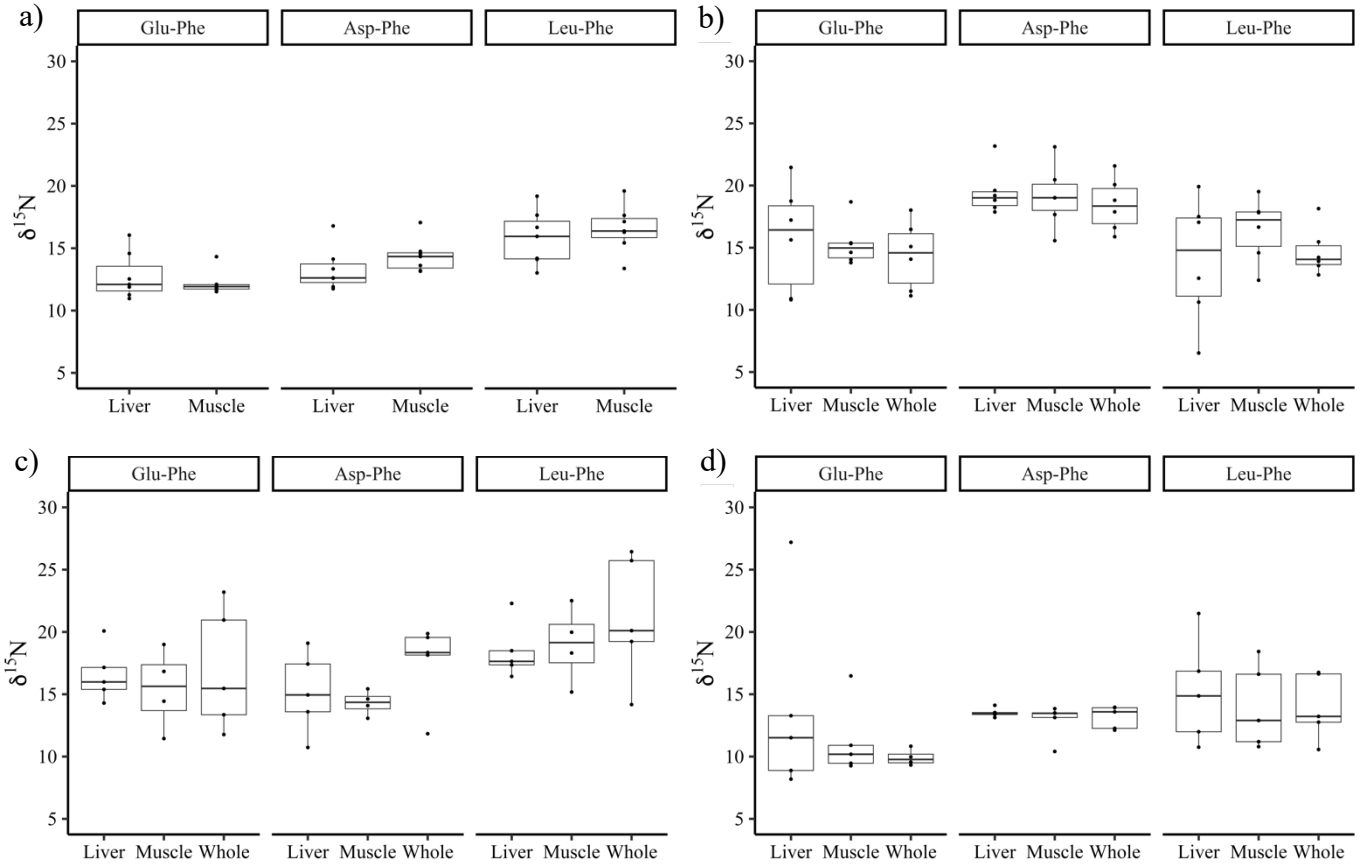

Fig. S2. δ^{15}N of three trophic amino acids (glutamic acid (Glu), aspartic acid (Asp) and leucine (Leu)), corrected by the source amino acid phenylalanine (Phe). Results were compared between liver, muscle and homogenised whole-organism ('Whole'). Taxa included a) harp seals, b) Atlantic cod, c) Arctic cod and d) capelin. For each box, the horizontal line represents the median, the box spans 50% of the data (interquartile range), whiskers define the upper and lower data range (excluding outliers), and dots represent outliers.

Table S3. Mean (± 1SD) tissue- and species-specific trophic discrimination factors (TDF) of glutamic acid (Glu), aspartic acid (Asp) and leucine (leu) with respect to phenylalanine (Phe).

Species	Tissue type	n	AA Combination	TDF	Average TDF
Harp seal	Muscle	12	Glu - Phe	2.5 (0.6)	3.1 (1.0)
			Asp - Phe	3.1 (0.5)	
			Leu - Phe	3.6 (0.6)	
	Liver	12	Glu - Phe	2.1 (0.6)	2.7 (0.8)
			Asp - Phe	2.7 (0.3)	
			Leu - Phe	3.3 (0.5)	
Atlantic cod	Muscle	6	Glu - Phe	3.1 (0.8)	3.7 (1.3)
			Asp - Phe	4.3 (0.6)	
			Leu - Phe	3.8 (0.9)	
	Liver	6	Glu - Phe	3.2 (0.8)	3.6 (1.3)
			Asp - Phe	4.4 (0.6)	
			Leu - Phe	3.2 (0.9)	
	Whole	6	Glu - Phe	2.9 (0.8)	3.5 (1.3)
			Asp - Phe	4.2 (0.6)	
			Leu - Phe	3.4 (0.9)	
Arctic cod	Muscle	4	Glu - Phe	4.5 (1.4)	5.2 (2.1)
			Asp - Phe	4.5 (0.7)	
			Leu - Phe	6.5 (1.4)	
	Liver	5	Glu - Phe	5.2 (1.6)	5.3 (2.4)
			Asp - Phe	4.5 (0.7)	
			Leu - Phe	6.3 (1.6)	
	Whole	5	Glu - Phe	4.7 (1.6)	5.8 (2.4)
			Asp - Phe	6.1 (0.7)	
			Leu - Phe	6.7 (1.6)	
Capelin	Muscle	5	Glu - Phe	3.2 (1.9)	4.1 (2.3)
			Asp - Phe	4.3 (0.4)	
			Leu - Phe	5.0 (1.3)	
	Liver	5	Glu - Phe	4.2 (1.9)	4.7 (2.3)
			Asp - Phe	4.5 (0.4)	
			Leu - Phe	5.5 (1.3)	
	Whole	5	Glu - Phe	2.7 (2.2)	4.0 (2.5)
			Asp - Phe	4.4 (0.4)	
			Leu - Phe	5.0 (1.3)	