Supplementary information

Cancer risk across mammals

In the format provided by the
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Supplementary Table 1 | List of species excluded from the analyses due to being subject to domestication. Domestication is likely to affect cancer risk, body mass or life expectancy.

Species	order
Atelerix_albiventris	Erinaceomorpha
Bos_gaurus	Artiodactyla
Bos_grunniens	Artiodactyla
Bos_javanicus	Artiodactyla
Bos_taurus	Artiodactyla
Camelus_bactrianus	Artiodactyla
Canis_lupus	Carnivora
Capra_hircus	Artiodactyla
Cavia_porcellus	Rodentia
Chinchilla_lanigera	Rodentia
Equus_africanus	Perissodactyla
Equus_asinus	Perissodactyla
Equus_caballus	Perissodactyla
Felis_catus	Carnivora
Lama_glama	Artiodactyla
Lama_guanicoe	Artiodactyla
Mephitis_mephitis	Carnivora
Mustela_putorius	Carnivora
Oryctolagus_cuniculus	Lagomorpha
Ovis_aries	Artiodactyla
Rattus_norvegicus	Rodentia
Sus_scrofa	Artiodactyla
Vicugna_pacos	Artiodactyla
Vicugna_vicugna	Artiodactyla

Supplementary Table 2. - Sensitivity analysis performed to test the effect of within-species sample size. Models were performed to explore the consistency of results of weighted logistic regressions of non-zero cancer risks when using a different minimum threshold of number of individuals with available postmortem pathological records. Models were run with a minimum of 20, 40, 60, 80 and 100 individuals with available postmortem pathological records per species (N). Slopes, standard errors and p values are presented for all models. Please note the considerable decrease in the number of species involved in the analyses (n) with increased within-species threshold sample sizes.

	Number of individuals with available post-mortem pathological record	N ≥ 20	N ≥ 40	N ≥ 60	N ≥ 80	N ≥ 100
		β ± SE [p-value]	β ± SE [p-value]	β ± SE [p-value]	β ± SE [p-value]	β ± SE [p-value]
	Weighted logistic reg.					
CMR	Intercept	-7.11 ± 1.82 [0.0001]	-4.53 ± 2.8 [0.1106]	-5.4 ± 3.76 [0.1567]	-3.36 ± 4.49 [0.4589]	-2.55 ± 5.01 [0.6148]
	Log body mass	-0.04 ± 0.05 [0.3754]	0.04 ± 0.07 [0.5242]	0.04 ± 0.09 [0.6367]	0.06 ± 0.10 [0.5793]	0.02 ± 0.11 [0.8559]
	Log life expectancy	0.42 ± 0.23 [0.0688]	0.12 ± 0.36 [0.7491]	0.25 ± 0.48 [0.6037]	-0.01 ± 0.57 [0.9916]	-0.09 ± 0.64 [0.8924]
	Number of species	n = 141	n = 81	n = 56	n = 42	n = 32
	Weighted logistic reg.					
ICM	Intercept	-7.27 ± 2.54 [0.0049]	-4.8 ± 4.03 [0.2378]	-4.04 ± 5.17 [0.4388]	-3.73 ± 6.35 [0.5611]	-3.20 ± 6.61 [0.6321]
	Log body mass	-0.09 ± 0.06 [0.1534]	-0.05 ± 0.10 [0.6025]	-0.07 ± 0.12 [0.5654]	-0.07 ± 0.13 [0.6208]	-0.15 ± 0.15 [0.3238]
	Log life expectancy	0.53 ± 0.32 [0.1049]	0.22 ± 0.52 [0.677]	0.13 ± 0.66 [0.8395]	0.10 ± 0.80 [0.9002]	0.08 ± 0.84 [0.9291]
	Number of species	n = 128	n = 77	n = 55	n = 41	n = 32

Supplementary Table 3. - Sensitivity analysis performed to test for collinearity issues. In order to demonstrate the lack of collinearity in models presented in Extended Data Table 3, here we present the results of models explaining variation in **a-b**, CMR and **c-d**, ICM, where body mass (**a,c**) and life expectancy (**b,d**) are entered in separate models.

	a. Effect of body mass on CMR				**b**. Effect of life expectancy on CMR		
	β (SE)	z/t-value	p-value		β (SE)	z/t-value	p-value
Probability of detecting cancer				**Probability of detecting cancer**			
Intercept	-4.09 (1.65)	-2.48	0.0131	Intercept	-10.21 (4.24)	-2.41	0.0161
Log no. individuals with post-mortem pathological record	0.06 (0.10)	0.64	0.5201	Log no. individuals with post-mortem pathological record	1.49 (0.38)	3.93	0.0001
Log body mass	1.41 (0.38)	3.77	0.0002	Log life expectancy	0.74 (0.47)	1.59	0.1130
ModelStats	*Ps2 < 0.0001*	*s2 = 2.31*	*n = 188*	*ModelStats*	*Ps2 = 0.0002*	*s2 = 1.9*	*n = 188*
Weighted logistic reg.				**Weighted logistic reg.**			
Intercept	-4.00 (0.47)	-8.55	0.0000	Intercept	-6.45 (1.62)	-3.97	0.0001
Log body mass	0.01 (0.04)	0.15	0.8784	Log life expectancy	0.32 (0.2)	1.6	0.1115
ModelStats	*AIC = 369.14*	*λ = 0.57*	*n = 141*	*ModelStats*	*AIC = 363.5*	*λ = 0.56*	*n = 141*

	c. Effect of body mass on ICM				**d**. Effect of life expectancy on ICM		
	β (SE)	z/t-value	p-value		β (SE)	z/t-value	p-value
Probability of detecting cancer				**Probability of detecting cancer**			
Intercept	-4.08 (1.67)	-2.45	0.0144	Intercept	-8.45 (4.50)	-1.88	0.0603
Log no. individuals with post-mortem pathological record	1.39 (0.38)	3.62	0.0003	Log no. individuals with post-mortem pathological record	1.42 (0.39)	3.70	0.0002
Log body mass	0.03 (0.1)	0.26	0.7923	Log life expectancy	0.54 (0.51)	1.06	0.2875
ModelStats	*Ps2 = 0.0004*	*s2 = 2.12*	*n = 169*	*ModelStats*	*Ps2 = 0.0020*	*s2 = 1.75*	*n = 169*
Weighted logistic reg.				**Weighted logistic reg.**			
Intercept	-3.22 (0.50)	-6.41	<0.0001	Intercept	-5.62 (2.27)	-2.47	0.0148
Log Body mass	-0.04 (0.06)	-0.67	0.5063	Log life expectancy	0.29 (0.28)	1.03	0.3029
ModelStats	*AIC = 404.15*	*λ = 0.39*	*n = 128*	*ModelStats*	*AIC = 400.26*	*λ = 0.4*	*n = 128*

Supplementary Table 4. - Sensitivity analysis performed to confirm the consistency of the results when high leverage species are included in the analyses. In order to demonstarte the consistency of the result while including the three species excluded from the analyses presented in the main text due to their high leverages (i.e. *Lagurus lagurus, Cricetus cricetus*, and *Dasyuroides byrnei*), here we present models exploring the association between **a**, CMR and **b**, ICM and body mass as well as life expectancy on the entire species pool.

	a. CMR			b. ICM		
	β (SE)	z/t-value	p-value	β (SE)	z/t-value	p-value
Probability of detecting cancer						
Intercept	-8.07 (4.71)	-1.71	0.0870	-6.33 (5.01)	-1.26	0.2070
Log no. individuals with post-mortem pathological record	1.44 (0.38)	3.79	0.0002	1.37 (0.38)	3.57	0.0004
Log body mass	-0.03 (0.12)	-0.27	0.7892	-0.05 (0.13)	-0.37	0.7126
Log life expectancy	0.53 (0.54)	0.97	0.3302	0.33 (0.59)	0.55	0.5791
Model Stats.	*Ps2<0.0001*	*s2 = 2.22*	*n = 191*	*Ps2 = 0.0010*	*s2 = 2.04*	*n = 172*
Weighted logistic reg.						
Intercept	-6.06 (1.84)	-3.30	0.0012	-5.94 (2.41)	-2.47	0.0150
Log body mass	-0.04 (0.05)	-0.84	0.4023	-0.10 (0.06)	-1.53	0.1282
Log life expectancy	0.29 (0.23)	1.23	0.2220	0.38 (0.31)	1.23	0.2210
Model Stats.	*AIC = 387.92*	*λ = 0.61*	*n = 144*	*AIC = 417.41*	*λ = 0.39*	*n = 131*