

## SUPPLEMENTARY MATERIAL

**Table S1.** The list of IDs of the dog skulls that were used in the CT scan analyses to create endocasts and compute brain volume (these specimens are housed at the Eötvös Loránd University). Lines are sorted alphabetically by abbreviation name (breed names are given in Table S2).

Abbreviation	Specimen ID	Abbreviation	Specimen ID	Abbreviation	Specimen ID
AFFP	ELTE-82-A	BICH	ELTE-22-A	BSJI	ELTE-14-B
AFGH	ELTE-2-A2	BICH	ELTE-22-B	BUC	ELTE-34-B
AFGH	ELTE-2-A	BICH	ELTE-22-	BULD	ELTE-6-C
AFGH	ELTE-2-B	BMD	ELTE-21-C2	BULD	ELTE-6-C2
AIRT	ELTE-1-B	BMD	ELTE-21-C	BULM	ELTE-35-C
AIRT	ELTE-1-A2	BMD	ELTE-21-	BULM	ELTE-35-A
AIRT	ELTE-1-B2	BMD	ELTE-21-A	BULM	ELTE-35-C2
AIRT	ELTE-1-A	BOL	ELTE-24-A	BULT	ELTE-36-C
AKIT	ELTE-3-B	BOL	ELTE-24-C	BULT	ELTE-36-A
AKIT	ELTE-3-A	BORD	ELTE-26-C	CAIR	ELTE-153-
AMAL	ELTE-85-A	BORD	ELTE-26-B	CANE	ELTE-39-C2
AMAL	ELTE-85-B	BORD	ELTE-26-A	CANE	ELTE-39-A
AMB	ELTE-4-A	BORT	ELTE-27-C	CANE	ELTE-39-B
AMB	ELTE-4-C	BORZ	ELTE-97-B	CANE	ELTE-39-C
AMB	ELTE-4-A2	BORZ	ELTE-97-	CANE	ELTE-39-
APBT	ELTE-106-C	BORZ	ELTE-97-C	CARD	ELTE-141-
APBT	ELTE-106-	BORZ	ELTE-97-A	CARD	ELTE-141-
APBT	ELTE-106-	BOST	ELTE-28-B2	CASD	ELTE-75-
APBT	ELTE-106-B	BOST	ELTE-28-B	CASD	ELTE-75-B
APBT	ELTE-106-	BOX	ELTE-30-B	CASD	ELTE-75-B2
AUSS	ELTE-12-A	BOX	ELTE-30-B2	CASD	ELTE-75-C
AUST	ELTE-13-A	BOX	ELTE-30-	CASD	ELTE-75-A
AUST	ELTE-13-C	BOX	ELTE-30-	CASD	ELTE-75-C2
BAND	ELTE-155-	BOX	ELTE-30-C3	CED	ELTE-67-C
BAND	ELTE-155-C	BOX	ELTE-30-	CHIH	ELTE-45-C
BASS	ELTE-29-A	BOX	ELTE-30-C2	CHIH	ELTE-45-C2
BASS	ELTE-29-B	BOX	ELTE-30-C	CHIH	ELTE-45-A
BASS	ELTE-29-	BOX	ELTE-30-A	CHIH	ELTE-45-
BEAG	ELTE-15-C	BRFG	ELTE-54-B	CHIH	ELTE-45-C3
BEAG	ELTE-15-C2	BRIA	ELTE-32-B	CHIN	ELTE-65-C
BEAG	ELTE-15-C3	BRIA	ELTE-32-C	CHIN	ELTE-65-B
BEAU	ELTE-17-C	BRIA	ELTE-32-B2	CHIN	ELTE-65-A
BEDT	ELTE-151-	BRIT	ELTE-31-C	CHOW	ELTE-43-A
BELS	ELTE-19-C	BRTR	ELTE-98-C	CHOW	ELTE-43-C
BELS	ELTE-19-A	BRTR	ELTE-98-B	CHOW	ELTE-43-C2
BICH	ELTE-22-B2	BRTR	ELTE-98-C2	CHOW	ELTE-43-C3
BICH	ELTE-22-C	BRUS	ELTE-33-A	CHOW	ELTE-43-B

Abbreviation	Specimen ID	Abbreviation	Specimen ID	Abbreviation	Specimen ID
CHW	ELTE-44-B	ESET	ELTE-10-C2	HUGR	ELTE-83-A
CKCS	ELTE-40-C	ESET	ELTE-10-B2	HUGR	ELTE-83-
CKCS	ELTE-40-B	ESET	ELTE-10-C	HUGR	ELTE-83-B
CMAS	ELTE-68-B	ESET	ELTE-10-B	HUGR	ELTE-83-
CMAS	ELTE-68-B2	ESET	ELTE-10-A	HUGR	ELTE-83-
COLL	ELTE-122-	ESET	ELTE-10-C3	HUGR	ELTE-83-C
COLL	ELTE-122-	ESSP	ELTE-8-A	HUGR	ELTE-83-B2
COLL	ELTE-122-C	FBUL	ELTE-53-A	HUSK	ELTE-61-A
COTO	ELTE-42-B	FBUL	ELTE-53-C	HUSK	ELTE-61-B
CRES	ELTE-72-	FBUL	ELTE-53-C2	HUSK	ELTE-61-C3
CRES	ELTE-72-B	FIBR	ELTE-50-B	HUSK	ELTE-61-C2
CRES	ELTE-72-C2	FIBR	ELTE-50-A	HUSK	ELTE-61-C
CRES	ELTE-72-B2	GABN	ELTE-9-A	INCA	ELTE-101-
CRES	ELTE-72-A	GESP	ELTE-150-B	ISET	ELTE-63-A
CRES	ELTE-72-C	GGG	ELTE-126-C	ISET	ELTE-63-C2
CSD	ELTE-69-C	GGG	ELTE-126-	ISET	ELTE-63-C
CSD	ELTE-69-C2	GOLD	ELTE-56-C	ISET	ELTE-63-B
CSD	ELTE-69-C3	GOLD	ELTE-56-C2	ITGY	ELTE-96-A
DACH	ELTE-132-B	GORD	ELTE-57-C	ITGY	ELTE-96-
DACH	ELTE-132-C	GPYR	ELTE-104-	ITGY	ELTE-96-B
DACH	ELTE-132-	GPYR	ELTE-104-C	IWOF	ELTE-62-B
DACH	ELTE-131-	GPYR	ELTE-104-	IWOF	ELTE-62-A
DACH	ELTE-132-	GPYR	ELTE-104-	JACK	ELTE-64-C2
DACH	ELTE-132-	GPYR	ELTE-104-	JACK	ELTE-64-C3
DALM	ELTE-46-C2	GPYR	ELTE-104-	JACK	ELTE-64-C
DALM	ELTE-46-C	GREE	ELTE-58-A	KCS	ELTE-73-C2
DANE	ELTE-91-C	GREY	ELTE-5-A	KCS	ELTE-73-C3
DANE	ELTE-91-B	GREY	ELTE-5-B2	KCS	ELTE-73-C
DANE	ELTE-91-A	GREY	ELTE-5-B3	KEES	ELTE-70-A
DDBX	ELTE-25-C	GREY	ELTE-5-B	KERY	ELTE-71-C
DDBX	ELTE-25-C2	GREY	ELTE-5-A2	KERY	ELTE-71-B
DDBX	ELTE-25-C3	GSD	ELTE-92-C3	KOMO	ELTE-74-A
DEER	ELTE-121-C	GSD	ELTE-93-A	KOMO	ELTE-74-C
DEER	ELTE-121-	GSD	ELTE-93-C	KOMO	ELTE-74-
DGA	ELTE-11-C	GSD	ELTE-92-C2	KUVZ	ELTE-76-A
DGA	ELTE-11-C2	GSD	ELTE-92-C	KUVZ	ELTE-76-C
DOBP	ELTE-47-A	GSD	ELTE-92-B	KUVZ	ELTE-76-C2
DOBP	ELTE-47-C	GSMD	ELTE-154-B	LAB	ELTE-77-
DOBP	ELTE-47-C2	GSNZ	ELTE-114-B	LAB	ELTE-77-C
DOBP	ELTE-47-C3	GSNZ	ELTE-114-C	LAB	ELTE-77-A
DUNK	ELTE-48-A	GSNZ	ELTE-114-	LEON	ELTE-80-A
ECKR	ELTE-41-B	GSPA	ELTE-55-A	LEON	ELTE-80-B
ECKR	ELTE-41-C2	GWHP	ELTE-95-C2	LEON	ELTE-80-B2
ECKR	ELTE-41-C3	GWHP	ELTE-95-C3	LEON	ELTE-80-
ECKR	ELTE-41-C	GWHP	ELTE-95-C	LEON	ELTE-80-
ECKR	ELTE-41-A	HANO	ELTE-148-C	LEON	ELTE-80-C
ECKR	ELTE-41-B2	HAVA	ELTE-59-A	LHSA	ELTE-81-A
ENPO	ELTE-107-C	HOV	ELTE-60-B	LMUN	ELTE-102-
ENPO	ELTE-107-	HOV	ELTE-60-A	LNDS	ELTE-78-A

Abbreviation	Specimen ID	Abbreviation	Specimen ID	Abbreviation	Specimen ID
LNDS	ELTE-78-C	PEKE	ELTE-100-C	STAF	ELTE-127-
MALT	ELTE-86-A	PEKE	ELTE-100-	STAF	ELTE-127-C
MAST	ELTE-7-A2	PEKE	ELTE-100-	STAF	ELTE-127-
MAST	ELTE-7-A3	PEMB	ELTE-142-C	STBD	ELTE-20-A
MAST	ELTE-7-A	PEMB	ELTE-142-B	STBD	ELTE-20-C
MAST	ELTE-7-C2	POLH	ELTE-79-C	STBD	ELTE-20-C4
MAST	ELTE-7-C3	POM	ELTE-108-	STBD	ELTE-20-C2
MAST	ELTE-7-C	POM	ELTE-108-	STBD	ELTE-20-C3
MAST	ELTE-7-B	POM	ELTE-108-C	TIBM	ELTE-133-
MBLT	ELTE-152-	POSH	ELTE-109-C	TIBT	ELTE-134-B
MBLT	ELTE-152-C	PUG	ELTE-87-C	TOSA	ELTE-135-
MDGS	ELTE-125-	PUG	ELTE-87-C2	TOSA	ELTE-135-B
MDGS	ELTE-125-C	PULI	ELTE-110-	TOSA	ELTE-135-
MDPO	ELTE-138-C	PULI	ELTE-110-	TOSA	ELTE-135-C
MDPO	ELTE-138-	PULI	ELTE-110-C	TRHO	ELTE-49-C
MDPO	ELTE-138-	PUMI	ELTE-111-	TURV	ELTE-18-C2
MDPO	ELTE-138-	PUMI	ELTE-111-C	TURV	ELTE-18-C
MDPO	ELTE-138-	PYRM	ELTE-105-	VIZS	ELTE-84-A
MDPO	ELTE-138-	RHOD	ELTE-112-	VIZS	ELTE-84-B
MDPO	ELTE-138-B	RHOD	ELTE-112-B	VIZS	ELTE-84-C
MNGS	ELTE-124-	RHOD	ELTE-112-	WEIM	ELTE-140-B
MNGS	ELTE-124-C	RHOD	ELTE-112-C	WEIM	ELTE-140-C
MNGS	ELTE-124-B	ROTT	ELTE-113-	WEIM	ELTE-140-
MNGS	ELTE-124-	ROTT	ELTE-113-	WELT	ELTE-143-B
MNGS	ELTE-124-	SALU	ELTE-94-A	WFOX	ELTE-51-B
MNGS	ELTE-124-	SAMO	ELTE-128-	WFOX	ELTE-51-C
MNGS	ELTE-124-	SCHA	ELTE-117-	WFOX	ELTE-51-C2
MOWA	ELTE-88-C	SCOT	ELTE-123-	WHIP	ELTE-145-
MOWA	ELTE-88-C2	SCOT	ELTE-123-	WHIP	ELTE-145-
MOWA	ELTE-88-A	SCOT	ELTE-123-	WHIP	ELTE-145-C
MOWA	ELTE-88-B	SERH	ELTE-130-C	WHIP	ELTE-145-
MPIN	ELTE-103-	SFOX	ELTE-52-A	WHWT	ELTE-144-C
MPIN	ELTE-103-C	SFOX	ELTE-52-B	WHWT	ELTE-144-
MPOO	ELTE-139-C	SFOX	ELTE-52-B2	WHWT	ELTE-144-
MSNZ	ELTE-116-C	SHAR	ELTE-118-C	WHWT	ELTE-144-
MUDI	ELTE-89-A	SHAR	ELTE-118-	WHWT	ELTE-144-
MUDI	ELTE-89-B	SHAR	ELTE-118-	WHWT	ELTE-144-
NEAP	ELTE-90-B	SHIH	ELTE-120-	WHWT	ELTE-144-
NEAP	ELTE-90-B2	SHIH	ELTE-120-C	WHWT	ELTE-144-
NEAP	ELTE-90-A	SMUN	ELTE-156-	WSSD	ELTE-66-A
NEWF	ELTE-136-C	SPOO	ELTE-137-	WSSD	ELTE-66-C
NEWF	ELTE-136-	SPOO	ELTE-137-B	YORK	ELTE-146-C
OES	ELTE-23-B	SSHP	ELTE-119-B	YORK	ELTE-146-
OES	ELTE-23-B2	SSHP	ELTE-119-	YORK	ELTE-146-
OES	ELTE-23-A	SSNZ	ELTE-115-	YUSD	ELTE-129-
PAPI	ELTE-99-A	STAF	ELTE-127-B	YUSD	ELTE-129-C
PEKE	ELTE-100-	STAF	ELTE-127-		

**Table S2.** Breed-specific phenotypic values of dogs used in the within-species analyses of relative brain size. Lines are sorted alphabetically by abbreviation name.

Breed name	Abbreviation	Body mass (g)	Brain volume (cm <sup>3</sup> )	Genetic distance from the wolf	AKC	Head	Age of death (years)	Litter size (#pups)
American Cocker Spaniel	ACKR	14288	75.227	0.363	Sporting	mesocephalic	11.42	4.97
Affenpinscher	AFFP	4500	54.186		Toy	brachycephalic	12.21	
Afghan Hound	AFGH	22800	97.237	0.338	Hound	dolichocephalic	11.92	
Airedale Terrier	AIRT	22900	82.869	0.369	Terrier	dolichocephalic	10.75	7.65
Akita Inu	AKIT	44800	106.794	0.321	Working	mesocephalic	10.46	
Alaskan Malamute	AMAL	36900	113.936	0.331	Working	mesocephalic	10.71	6.50
American Bulldog	AMB	39950	124.305			brachycephalic		
American Pit Bull Terrier	APBT	24933	91.019			mesocephalic	11.00	
Australian Shepherd	AUSS	21500	81.892	0.355	Herding	mesocephalic	11.00	7.00
Australian Terrier	AUST	6500	59.613	0.357	Terrier	mesocephalic	13.54	5.25
Bandog	BAND	51000	117.538			brachycephalic		
Basset Hound	BASS	26583	101.278	0.361	Hound	dolichocephalic	10.80	5.92
Beagle	BEAG	14614	78.631	0.358	Hound	brachycephalic	11.34	5.15
Beauceron (Beauce Sheep Dog)	BEAU	49900	119.348		Herding	mesocephalic		
Bedlington terrier	BEDT	9100	85.869	0.367	Terrier	dolichocephalic	13.84	5.60
Belgian Shepherd Dog - Groenendael	BELS	25000	88.985	0.358	Herding	mesocephalic	12.20	6.30
Bearded Collie	BERD	24050	97.796	0.359	Herding	dolichocephalic	12.98	
Bichon Frisé	BICH	7011	62.060	0.352	Non-sporting	brachycephalic	12.92	5.10
Bernese Mountain Dog (Berner Sennenhund)	BMD	45120	111.428	0.361	Working	brachycephalic	8.00	6.57
Bichon Bolognese	BOL	3313	60.392			brachycephalic		
Border Collie	BORD	19239	89.129	0.353	Herding	mesocephalic	12.63	6.00

Breed name	Abbreviation	Body mass (g)	Brain volume (cm <sup>3</sup> )	Genetic distance from the wolf	AKC	Head	Age of death (years)	Litter size (#pups)
Border Terrier	BORT	10214	77.338	0.363	Terrier	mesocephalic	12.94	4.65
Borzoi	BORZ	39600	97.725	0.355	Hound	dolichocephalic	10.04	
Boston Terrier	BOST	9186	77.273	0.364	Non-sporting	brachycephalic	10.92	3.85
Boxer	BOX	30103	99.104	0.422	Working	brachycephalic	9.50	6.04
French Pointing Dog - Gascogne type (Braque Francais, type Gascogne)	BRFG	21000	94.812			dolichocephalic		
Briard	BRIA	34900	93.314	0.360	Herding	mesocephalic	11.09	
Brittany (French Brittany)	BRIT	17000	78.880	0.357	Sporting	mesocephalic	12.54	6.23
Black Russian Terrier	BRTR	51100	109.896	0.358	Working	dolichocephalic	6.90	
Griffon Bruxellois	BRUS	5100	60.904	0.358	Toy	brachycephalic	12.75	3.38
Basenji	BSJI	10000	54.877	0.331	Hound	mesocephalic	12.27	5.15
Bucovina Shepherd Dog (Southeastern European Shepherd)	BUC	70000	114.678			mesocephalic		
Bulldog	BULD	24867	106.282	0.377	Non-sporting	brachycephalic	6.70	4.99
Bullmastiff	BULM	54180	118.466	0.368	Working	brachycephalic	8.03	6.70
Bull Terrier	BULT	25600	88.247	0.378	Terrier	mesocephalic	11.20	5.85
Cairn terrier	CAIR	8100	73.532	0.355	Terrier	brachycephalic	13.41	4.30
Cane Corso	CANE	48800	111.919	0.360	Working	brachycephalic		
Welsh Corgi - Cardigan	CARD	14000	87.893	0.358	Herding	brachycephalic	12.59	
Central Asian Shepherd Dog (Ovtcharka)	CASD	60557	115.208			mesocephalic		
Curly Coated Retriever	CCRT	36000	112.563	0.358	Sporting	mesocephalic	11.88	
Canadian Eskimo Dog	CED	39000	90.946			mesocephalic		
Chihuahua	CHIH	2828	55.009	0.348	Toy	brachycephalic	12.42	3.19
Japanese Chin	CHIN	3900	48.384	0.349	Toy	brachycephalic	11.13	
Chow Chow	CHOW	25667	74.523	0.315	Non-sporting	brachycephalic	9.38	4.15
Czechoslovakian Wolfdog	CHW	22200	107.894			dolichocephalic		
Cavalier King Charles Spaniel	CKCS	10411	79.774	0.364	Toy	brachycephalic	10.30	4.30

Breed name	Abbreviation	Body mass (g)	Brain volume (cm <sup>3</sup> )	Genetic distance from the wolf	AKC	Head	Age of death (years)	Litter size (#pups)
Canary Mastiff (Perro de Presa Canario)	CMAS	56100	108.566			brachycephalic		
Collie	COLL	28100	84.146	0.365	Herding	dolichocephalic	12.00	5.83
Coton de Tulear	COTO	6100	61.340	0.351	Non-sporting	brachycephalic		4.10
Chinese Crested Dog	CRES	5300	61.757	0.355	Toy	brachycephalic	11.04	4.30
Caucasian Shepherd Dog	CSD	53020	119.006			mesocephalic		
Dachshund	DACH	8457	66.194	0.354	Hound	dolichocephalic	12.20	4.37
Dalmatian	DALM	24888	86.685	0.357	Non-sporting	mesocephalic	12.50	7.10
Great dane	DANE	58917	118.590	0.360	Working	mesocephalic	6.25	6.83
Bordeaux Dog (Dogue de Bordeaux)	DDBX	60700	112.441	0.371	Working	brachycephalic	5.50	8.10
Scottish Deerhound	DEER	40200	110.069	0.367	Hound	dolichocephalic	9.09	
Dogo Argentino	DGA	40800	121.076			mesocephalic		8.12
Doberman Pinscher	DOBP	34622	98.862	0.362	Working	dolichocephalic	9.50	7.34
Norwegian Hound (Dunker)	DUNK	14500	93.839			mesocephalic		7.40
English Cocker Spaniel	ECKR	13604	78.315	0.361	Sporting	dolichocephalic	10.96	5.50
English Pointer	ENPO	28767	105.061		Sporting	mesocephalic	12.42	6.95
English Setter	ESET	28500	97.593	0.356	Sporting	dolichocephalic	11.20	5.97
English Springer Spaniel	ESSP	21355	87.985	0.359	Sporting	dolichocephalic	12.00	6.65
French Bulldog	FBUL	11037	85.894	0.369	Non-sporting	brachycephalic	9.50	4.93
Flat-Coated Retriever	FCR	35725	93.046	0.363	Sporting	dolichocephalic	9.67	7.56
Fila Brasileiro	FIBR	69500	108.934			mesocephalic		
Grand Anglo-Français Blanc et Noir	GABN	29500	117.793			dolichocephalic		
Spanish sighthound (Galgo Español)	GESP	26000	113.114			dolichocephalic		
Giant German Spitz	GGs	17500	100.043			mesocephalic		
Golden Retriever	GOLD	29342	101.457	0.360	Sporting	mesocephalic	11.88	7.18
Gordon Setter	GORD	33250	101.341	0.356	Sporting	dolichocephalic	11.30	7.55
Great Pyrenees (Pyrenean Mountain Dog)	GPYR	51500	125.300	0.357	Working	mesocephalic	10.79	

Breed name	Abbreviation	Body mass (g)	Brain volume (cm <sup>3</sup> )	Genetic distance from the wolf	AKC	Head	Age of death (years)	Litter size (#pups)
Greenland Dog	GREE	31000	64.970	0.329		mesocephalic	8.46	5.60
Greyhound	GREY	31842	103.128	0.363	Hound	dolichocephalic	10.80	5.94
German Shepherd Dog	GSD	33242	95.997	0.361	Herding	dolichocephalic	9.79	6.60
German Short Haired Pointer	GSHP	27700	88.513	0.353	Sporting	dolichocephalic	10.50	7.95
Greater Swiss Mountain Dog	GSMD	60000	103.321	0.365	Working	mesocephalic	10.20	7.90
Giant Schnauzer	GSNZ	39800	103.712	0.358	Working	mesocephalic	10.50	7.75
German Spaniel	GSPA	21500	109.270			mesocephalic		
German Pointer, Wire-haired	GWHP	29500	97.029	0.353	Sporting	dolichocephalic	10.00	
Hanover hound	HANO	40500	85.120			mesocephalic		
Bichon Havanese	HAVA	5060	68.610	0.353	Toy	brachycephalic	12.38	4.92
Hovawart	HOV	32900	104.261			mesocephalic	12.92	
Hungarian Greyhound	HUGR	26500	103.456			dolichocephalic		
Siberian Husky	HUSK	22954	90.329	0.326	Working	mesocephalic	12.00	5.50
Peruvian Hairless Dog	INCA	14500	80.692	0.351		mesocephalic		
Irish Setter	ISET	30933	96.149	0.360	Sporting	dolichocephalic	11.44	7.52
Italian Greyhound	ITGY	5875	67.304	0.358	Toy	mesocephalic	14.25	3.30
Irish Wolfhound	IWOF	54500	120.594	0.364	Hound	dolichocephalic	6.62	6.01
Jack Russell Terrier	JACK	7721	66.011	0.353		brachycephalic	13.50	4.14
King Charles Spaniel	KCS	6950	86.148		Toy	brachycephalic	10.10	2.88
Keeshond (Wolfspitz)	KEES	19550	77.027	0.354	Non-sporting	mesocephalic	12.61	
Kerry Blue Terrier	KERY	12500	75.544	0.364	Terrier	mesocephalic	12.25	4.85
Komondor	KOMO	50050	109.124	0.350	Working	mesocephalic	10.57	6.70
Kuvasz	KUVZ	43800	132.534	0.350	Working	mesocephalic		
Labrador Retriever	LAB	30392	99.677	0.358	Sporting	mesocephalic	11.88	6.73
Leonberger	LEON	60700	120.018	0.359	Working	mesocephalic	8.75	7.54
Lhasa Apso	LHSA	9100	60.401	0.340	Non-sporting	brachycephalic	13.00	4.80

Breed name	Abbreviation	Body mass (g)	Brain volume (cm <sup>3</sup> )	Genetic distance from the wolf	AKC	Head	Age of death (years)	Litter size (#pups)
Large Münsterländer	LMUN	30000	108.282	0.355		mesocephalic	11.33	
Landseer	LNDS	65000	127.000			mesocephalic		
Maltese	MALT	4295	50.379	0.352	Toy	brachycephalic	12.88	4.90
English Mastiff	MAST	80411	116.761	0.365	Working	brachycephalic	7.10	7.70
Miniature bull terrier	MBLT	12500	72.147	0.374	Terrier	dolichocephalic	9.29	
Medium German Spitz	MDGS	12500	70.555			mesocephalic		
Medium Poodle	MDPO	11000	68.077		Non-sporting	dolichocephalic	15.00	4.25
Miniature German Spitz	MNGS	8500	61.276			brachycephalic	11.33	
Moscow Watchdog	MOWA	56700	118.315			mesocephalic		
Miniature Pinscher	MPIN	4133	52.991	0.360	Toy	dolichocephalic	14.00	3.85
Miniature Poodle	MPOO	6880	67.019	0.358	Non-sporting	dolichocephalic	14.20	3.65
Miniature Schnauzer	MSNZ	8694	63.517	0.364	Terrier	mesocephalic	10.98	4.32
Mudi	MUDI	13333	73.922			brachycephalic		
Neapolitan Mastiff (Mastino Napoletano)	NEAP	60000	109.930	0.360	Working	brachycephalic	2.33	
Newfoundland	NEWF	54450	98.187	0.359	Working	brachycephalic	9.54	6.48
Nova Scotia Duck-Tolling Retriever (Toller)	NSDT	14500	80.822	0.358	Sporting	mesocephalic	10.50	6.60
Old English Sheepdog (Bobtail)	OES	33800	91.590	0.360	Herding	mesocephalic	10.75	7.65
Papillon (Continental Toy Spaniel)	PAPI	3900	62.039	0.354	Toy	brachycephalic	13.29	3.62
Pekingese	PEKE	4617	55.210	0.348	Toy	brachycephalic	11.42	3.00
Welsh Corgi	PEMB	13033	80.085	0.360	Herding	mesocephalic	12.11	5.13
Polish Hound	POLH	26000	100.888			mesocephalic		7.20
Pomeranian	POM	3225	55.702	0.351	Toy	brachycephalic	12.34	2.63
Portuguese Sheepdog (Cão da Serra de Aires)	POSH	22000	74.815			mesocephalic		
Pug	PUG	8518	77.954	0.363	Toy	brachycephalic	12.00	4.20
Puli	PULI	12388	85.730	0.353	Herding	mesocephalic	12.42	
Pumi	PUMI	11600	75.785	0.349	Herding	mesocephalic		

Breed name	Abbreviation	Body mass (g)	Brain volume (cm <sup>3</sup> )	Genetic distance from the wolf	AKC	Head	Age of death (years)	Litter size (#pups)
Pyrenean Mastiff	PYRM	89600	122.620			mesocephalic		
Rhodesian Ridgeback	RHOD	35160	112.936	0.357	Hound	dolichocephalic	10.05	9.20
Rottweiler	ROTT	46920	102.305	0.361	Working	brachycephalic	8.92	8.50
Saluki	SALU	22500	87.653	0.335	Hound	dolichocephalic	12.25	
Samoyed	SAMO	22250	90.386	0.342	Working	brachycephalic	11.00	6.10
Schapendoes (Dutch Sheepdog)	SCHA	15900	80.019			mesocephalic		6.11
Scottish Terrier	SCOT	9400	70.980	0.361	Terrier	dolichocephalic	11.13	4.90
Wheaten Terrier	SCWT	19550	72.932	0.364	Terrier	dolichocephalic	13.00	5.80
Serbian Hound	SERH	17000	91.944			mesocephalic		
Fox Terrier, Smooth	SFOX	6400	67.505		Terrier	dolichocephalic		4.10
Shar Pei	SHAR	16900	83.959	0.321	Non-sporting	brachycephalic	7.65	5.00
Shih Tzu	SHIH	7017	61.770	0.347	Toy	brachycephalic	13.24	4.24
Silky Terrier	SILK	4400	46.832	0.354	Toy	mesocephalic	13.38	
Small Münsterländer	SMUN	17100	89.527			mesocephalic	11.00	6.90
Poodle Medium	SPOO	18987	96.824	0.367	Non-sporting	dolichocephalic	12.00	6.70
Shetland Sheepdog	SSHP	9933	55.602	0.361	Herding	dolichocephalic	12.50	3.74
Standard Schnauzer	SSNZ	12467	67.836	0.356	Working	mesocephalic	12.48	5.10
Staffordshire Bull Terrier	STAF	16727	95.225	0.368	Terrier	brachycephalic	10.77	5.60
St. Bernard	STBD	64214	125.693	0.359	Working	mesocephalic	7.00	7.48
Tibetan Mastiff	TIBM	53500	108.451	0.317	Working	mesocephalic	11.92	
Tibetan Terrier	TIBT	10900	84.943	0.347	Non-sporting	mesocephalic	13.24	5.40
Tosa	TOSA	63500	113.780			brachycephalic		
Toy Poodle	TPOO	3600	62.697	0.355	Toy	dolichocephalic	14.63	2.40
Transylvanian Hound	TRHO	28500	100.307			mesocephalic		
Belgian Shepherd Dog - Tervueren	TURV	25000	102.008	0.357	Herding	dolichocephalic	13.00	6.12
Toy Fox Terrier	TYFX	3400	54.336	0.356	Toy	mesocephalic	14.00	

Breed name	Abbreviation	Body mass (g)	Brain volume (cm <sup>3</sup> )	Genetic distance from the wolf	AKC	Head	Age of death (years)	Litter size (#pups)
Vizsla	VIZS	25429	99.571	0.356	Sporting	dolichocephalic	12.50	
Weimaraner	WEIM	34173	103.001	0.360	Sporting	dolichocephalic	10.33	
Welsh Terrier	WELT	8800	64.621		Terrier	dolichocephalic	11.84	4.00
Fox Terrier, Wire	WFOX	7100	63.576	0.365	Terrier	dolichocephalic	13.00	3.90
Whippet	WHIP	11970	83.523	0.363	Hound	dolichocephalic	12.79	5.25
West Highland White Terrier	WHWT	8475	71.490	0.362	Terrier	brachycephalic	12.87	3.72
White Swiss Shepherd Dog (Berger Blanc Suisse, White German Shepherd, White Shepherd)	WSSD	32400	104.929			mesocephalic		6.50
Yorkshire Terrier	YORK	3725	53.149	0.357	Toy	mesocephalic	12.80	3.77
Yugoslavian Shepherd Dog (Šarplaninac)	YUSD	32400	121.075			mesocephalic		

**Table S3.** A phylogenetic mixed model testing for the effect of function, head shape, longevity and litter size on brain size in dogs when controlling for body mass and the effects due to common descent and gene flow.

<b>Response:</b> brain volume ( $\log_{10}$ )		DIC: -391.003
<b>RANDOM EFFECTS</b>		$\sigma^2$ (95 % CrI)
genetic distance (common ancestry, $\sigma_a^2$ )	0.063 (0.036 – 0.099)	
haplotype sharing (gene flow, $\sigma_b^2$ )	0.022 (0.014 – 0.029)	
Residual ( $\sigma_e^2$ )	0.001 (0.000 – 0.003)	
<b>FIXED EFFECTS</b>		$\beta$ (95 % CrI) pMCMC
Intercept	0.718 (-0.674 – 2.543)	0.388
body mass ( $\log_{10}$ )	0.275 (-0.065 – 0.570)	0.098
AKC [hounds]	0.022 (-0.194 – 0.206)	0.810
AKC [non-sporting dogs]	0.022 (-0.176 – 0.221)	0.818
AKC [sporting dogs]	0.009 (-0.175 – 0.197)	0.932
AKC [terriers]	0.021 (-0.170 – 0.209)	0.844
AKC [toy dogs]	0.053 (-0.179 – 0.261)	0.602
AKC [working dogs]	0.008 (-0.175 – 0.182)	0.898
head shape [dolichocephalic]	0.004 (-0.121 – 0.125)	0.952
head shape [mesocephalic]	-0.002 (-0.118 – 0.108)	0.980
longevity (age at death)	-0.001 (-0.036 – 0.034)	0.988
litter size (number of pups)	0.002 (-0.054 – 0.061)	0.966