

Supplementary Materials for
The child who lived: Down syndrome among Neanderthals?

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Sci. Adv. **10**, eadn9310 (2024)
DOI: 10.1126/sciadv.adn9310

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Supplementary Text
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Other Supplementary Material for this manuscript includes the following:

Data S1 to S5

Text

Discriminant analysis

Table S1 shows the basic statistics and the Shapiro-Wilks test of normality of all groups for all variables. We also performed the Box's M test to check the homogeneity of the covariance matrices for those groups (table S2). Once these assumptions have been checked, a discriminant analysis is performed with the four variables. Classification results are shown in the table S3.

83.5% of the original clustered cases are correctly classified. 77.2% of cross-validated clustered cases classified correctly. From those cases, 96.6% of neandertal individuals are correctly classified in both original and Crossing validation. Only Le Moustier 1 is classified as Fossil *Homo sapiens*. One Fossil *Homo sapiens* and one recent *Homo sapiens* are also classified as neandertals, these are Qazfeh 15 (probability of belonging to neandertals = 0.563 original functions and 0.719 in cross validation) and CSJ-50 (P = 0.774 and 0.814 respectively). CN-46700 is assigned to Neanderthals with a probability of 94%.

Recent modern humans are correctly classified in the 80.8% with original functions and 76.9 in cross validation. Fossil modern humans are the less accurate in the classification, being 70.8% and 54.2 in original and cross validation options. In those two groups, the misclassification are between them, and not with Neanderthals, except the ones mentioned above.



Figure S1. View of the left sagittal section of the south sector (squares P11 and P12) at the end of the 1989 campaign. Red arrow indicates the position of the disturbed surface level, which has not been dated, where CN-46700 has been recovered.

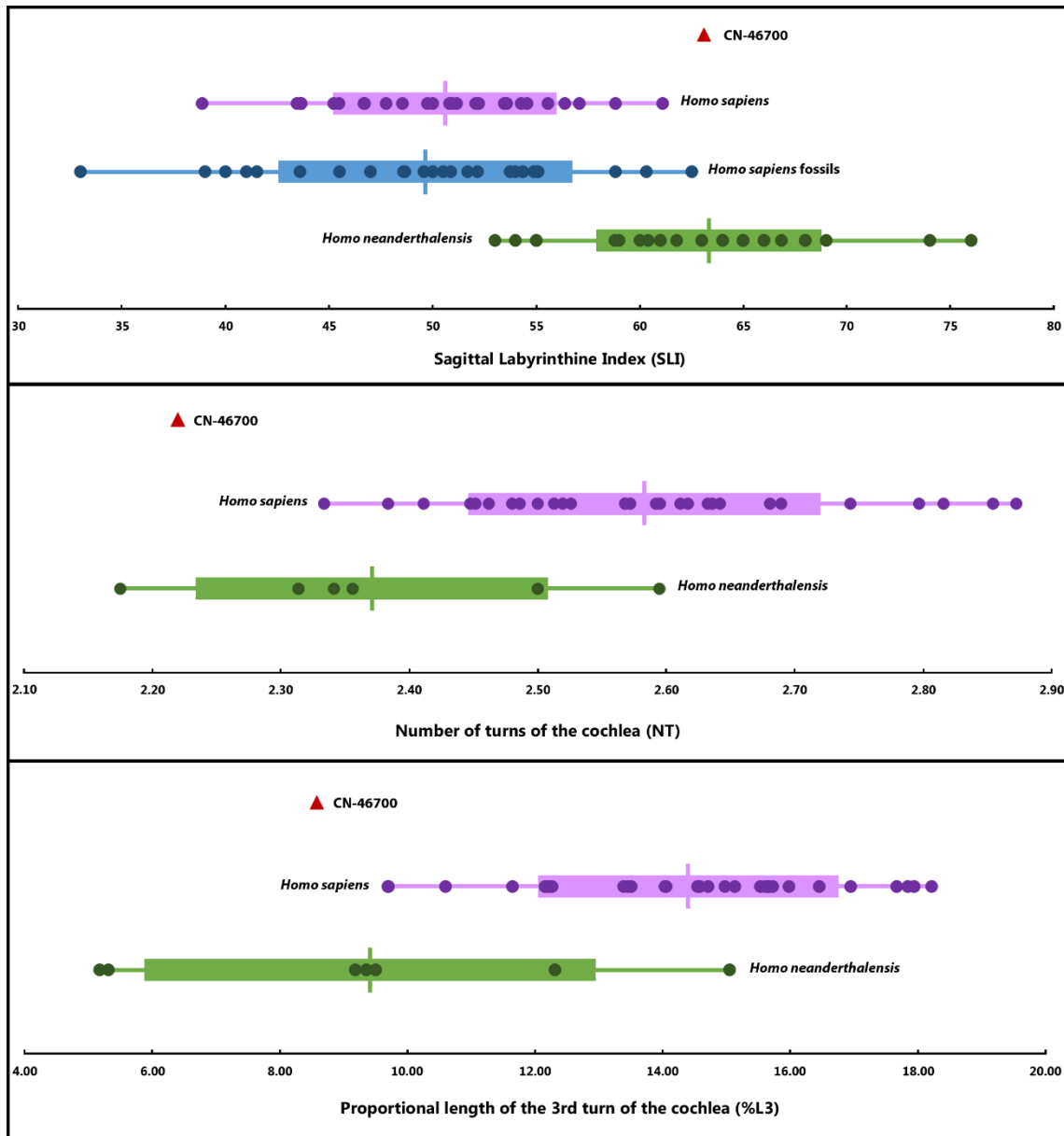


Fig. S2. Range of variation of taxonomically diagnostic inner ear variables in our samples of Neanderthals, *Homo sapiens* and the individual CN-46700. The vertical bar indicates the mean, the thick horizontal bar represents ± 1 standard deviation, and the thin horizontal bar corresponds to the range in each sample.

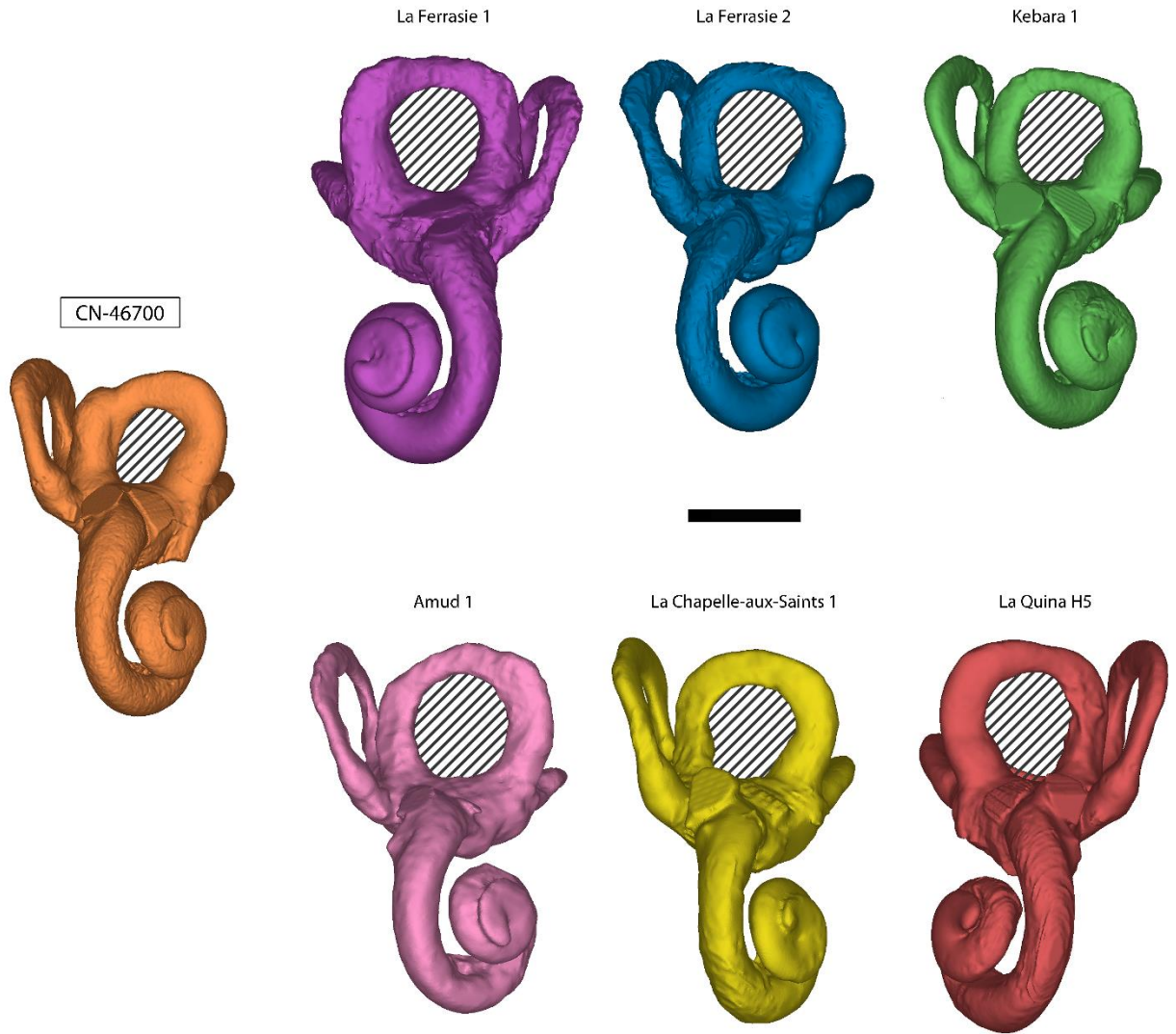


Fig. S3. 3D model of the inner ear of CN-46700 compared to other Neanderthals. The striped area indicates the dimensions of the bony island of CN-46700 compared to other Neanderthal specimens in the sample. Scale bar = 5 mm.

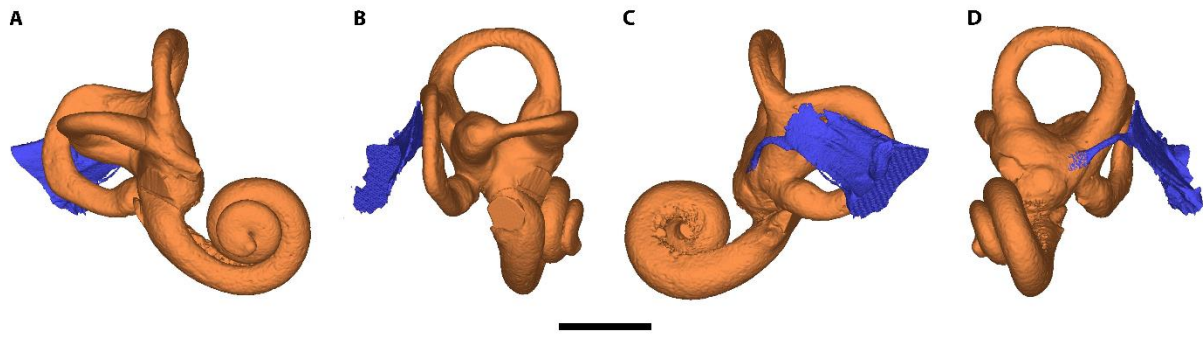


Fig. S4. 3D model of the inner ear (orange) and vestibular aqueduct (blue) of CN-46700. A: anterior view; B: lateral view; C: posterior view; D: medial view. Scale bar = 5 mm.

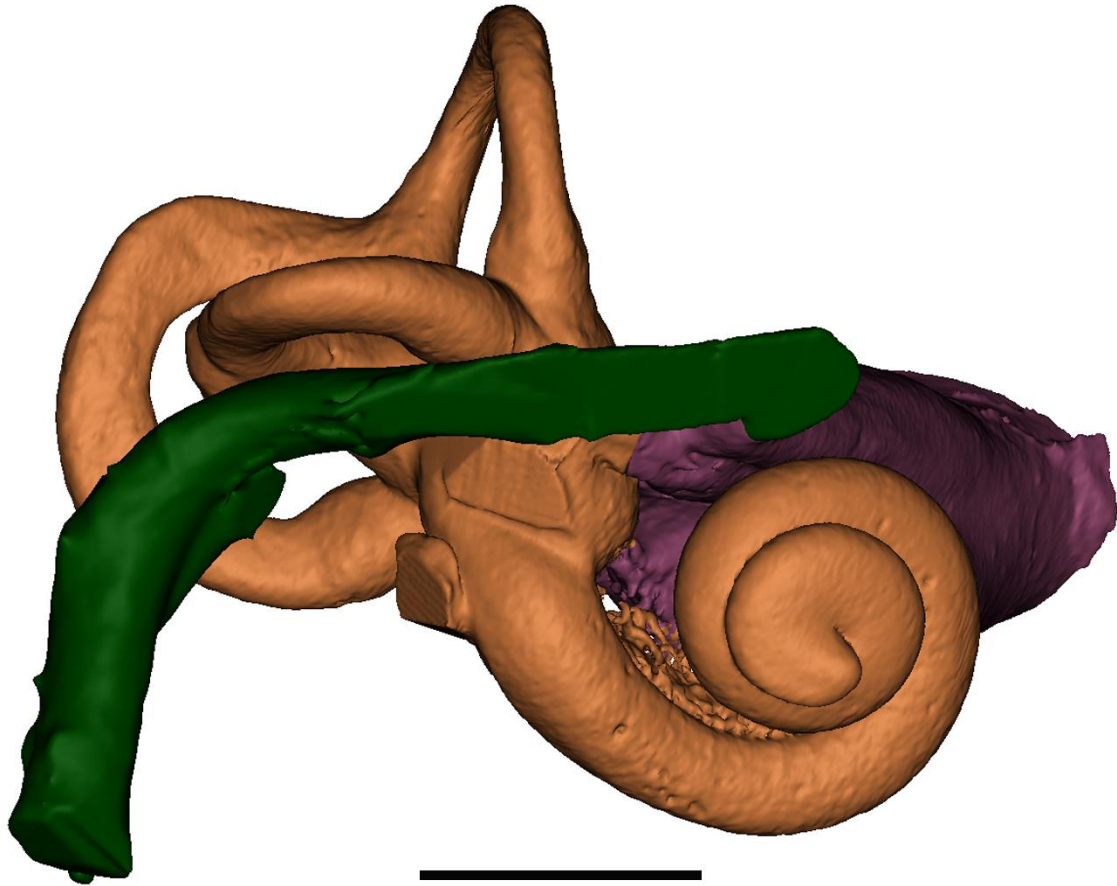


Fig. S5. 3D model of the inner ear and the trajectory of the facial nerve in CN-46700. Inner ear is in orange, internal auditory canal is in magenta, and facial nerve is in green. The facial nerve has a normal trajectory between the lateral semicircular canal and the cochlea. Scale bar = 5mm.

Table S1. Basic statistics and Normality test by groups

		N	Mean	Std. Deviation	Shapiro-Wilk	P-value of Shapiro-Wilk
ASC-R	Fossil <i>H. sapiens</i>	25	3.29	0.18	0.946	0.20
	<i>H. neanderthalensis</i>	30	3.02	0.17	0.944	0.12
	Recent <i>H. sapiens</i>	26	3.13	0.24	0.975	0.76
PSC-R	Fossil <i>H. sapiens</i>	24	3.01	0.20	0.916	0.05
	<i>H. neanderthalensis</i>	29	2.82	0.24	0.966	0.46
	Recent <i>H. sapiens</i>	26	3.10	0.26	0.942	0.15
LSC-R	Fossil <i>H. sapiens</i>	25	2.46	0.17	0.980	0.89
	<i>H. neanderthalensis</i>	30	2.56	0.15	0.951	0.18
	Recent <i>H. sapiens</i>	26	2.32	0.22	0.966	0.53
SLI	Fossil <i>H. sapiens</i>	26	49.29	7.20	0.973	0.71
	<i>H. neanderthalensis</i>	29	62.98	5.71	0.959	0.31
	Recent <i>H. sapiens</i>	26	50.46	5.34	0.991	1.00

Table S2. Box's M-test for Homogeneity of Covariance Matrices

χ^2	df	p
27.641	20	0.118

Table S3. Discriminant analysis carried out taking into account the number of individuals in each group.

	Group	Correct cases			Total
		<i>H. neanderthalensis</i>	Fossil <i>H. sapiens</i>	Recent <i>H. sapiens</i>	
Original	<i>H. neanderthalensis</i>	28	1	0	29
	Fossil <i>H. sapiens</i>	1	17	6	24
	Recent <i>H. sapiens</i>	1	4	21	26
Cross validation	<i>H. neanderthalensis</i>	28	1	0	29
	Fossil <i>H. sapiens</i>	1	13	10	24
	Recent <i>H. sapiens</i>	1	5	20	26

Data S1. Individual values of number of turns (NT) and proportional length of the third turn (%L3) of the sample use for taxonomical diagnosis.

Separate file.

Data S2. Individual values of the Neanderthal, *Homo sapiens* fossils and recent *Homo sapiens* samples of the taxonomic diagnostic variables of the inner ear.

Separate file.

Radii of curvature of the Anterior Semicircular Canal (ASR-R), Posterior Semicircular Canal (PSC-R), Lateral Semicircular Canal (LSC-R) and Sagittal Labyrinthine Index (SLI).

Data S3. Individual values of the Neanderthal sample of the pathologically diagnostic variables of the inner ear.

Separate file.

LSC: Lateral Semicircular Canal; ASC: Anterior Semicircular Canal; PSC: Posterior Semicircular Canal; VA: Vestibular Aqueduct; V: Vestibule; C: Cochlea; CNC: Cochlear Nerve Canal. *Data from (104)

Data S4. Measurement protocol of the pathologically diagnostic variables of the inner ear.

Separate file.

LSC: Lateral Semicircular Canal; ASC: Anterior Semicircular Canal; PSC: Posterior Semicircular Canal; VA: Vestibular Aqueduct; V: Vestibule; C: Cochlea; CNC: Cochlear Nerve Canal

Data S5. 3D model of the inner ear of CN-46700

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