Table S1 Correlation analyses between hippocampal subregional volumetric measures and clinical scores in controls

Controls										
	MMSE		**CDR**		**NIPQ**		**GDS**		**FAQ**	
	Left	**Right**	**Left**	**Right**	**Left**	**Right**	**Left**	**Right**	**Left**	**Right**
	r(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*
Pos HPC/eTIV	0,11(220), *P* = 0.09	0,20(220), *P* = 0.003	-0,16(220), *P* = 0.02	-0,16(220), *P* = 0.02	-0,15(197), *P* = 0.03	-0,15(197), *P* = 0.13	-0,08(220), *P* = 0.23	-0,10(220), *P* = 0.15	-0,24(217), *P* < 0.001	-0,30(232), *P* < 0.001
Int HPC/eTIV	0,17(219), *P* =0.01	0,25(217), *P* < 0.001	-0,18(219), *P* = 0.008	-0,17(217), *P* = 0.01	-0,13(196), *P* = 0.07	-0,09(195), *P* = 0.21	-0,04(219), *P* = 0.58	0,00(217), *P* = 0.96	-0,25(216), *P* < 0.001	-0,34(229), *P* < 0.001
Ant HPC/eTIV	0,25(220), *P* < 0.001	0,20(220), *P* = 0.003	-0,18(220), *P* = 0.009	-0,16(220), *P* = 0.02	-0,13(197), *P* = 0.07	-0,11(197), *P* = 0.13	-0,08(220), *P* = 0.25	-0,05(220), *P* = 0.46	-0,33(217), *P* < 0.001	-0,32(232), *P* < 0.001
Ant HPC/Pos HPC	0,08(220), *P* = 0.25	-0,13(220), *P* = 0.06	0,06(220), *P* =0.39	0,09(220), *P* = 0.18	0,09(197), *P* = 0.22	0,11(197), *P* = 0.11	0,04(220), *P* = 0.54	0,12(220), *P* = 0.07	0,03(217), *P* = 0.70	0,13(217), *P* = 0.05
Adj. α	0.0250	0.0375	0.0375	0.0375					0.0375	0.0500

Last line indicates α level that indicates statistical significance after adjustment for multiple comparisons with Benjamini–Hochberg (FDR < 5%)

Table S2 Correlation analyses between hippocampal subregional volumetric measures and clinical scores in ADc

ADc										
	MMSE		**CDR**		**NIPQ**		**GDS**		**FAQ**	
	Left	**Right**	**Left**	**Right**	**Left**	**Right**	**Left**	**Right**	**Left**	**Right**
	r(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*
Pos HPC/eTIV	0,32(742), *P* < 0.001	0,31(742), *P* < 0.001	-0,29(741), *P* < 0.001	-0,29(741), *P* < 0.001	-0,07(687), *P* = 0.08	-0,07(687), *P* = 0.05	-0,02(740), *P* = 0.62	0,00(740), *P* = 0.94	-0,30(731), *P* < 0.001	-0,31(731), *P* < 0.001
Int HPC/eTIV	0,31(742), *P* < 0.001	0,33(740), *P* < 0.001	-0,29(741), *P* < 0.001	-0,31(739), *P* < 0.001	-0,11(687), *P* = 0.003	-0,10(685), *P* = 0.01	-0,04(740), *P* = 0.34	0,01(738), *P* = 0.70	-0,33(731), *P* < 0.001	-0,34(729), *P* < 0.001
Ant HPC/eTIV	0,28(743), *P* < 0.001	0,34(742), *P* < 0.001	-0,28(742), *P* < 0.001	-0,29(741), *P* < 0.001	-0,09(688), *P* = 0.02	-0,10(687), *P* = 0.01	-0,04(741), *P* = 0.24	0,00(740), *P* = 0.94	-0,31(732), *P* < 0.001	-0,35(731), *P* < 0.001
Ant HPC/Pos HPC	-0,14(743), *P* < 0.001	-0,07(741), *P* = 0.06	0,10(742), *P* =0.005	0,07(740), *P* = 0.05	0,00(688), *P* = 0.94	-0.02(686), *P* = 0.57	-0,02(741), *P* = 0.66	0,01(739), *P* = 0.87	0,08(732), *P* = 0.04	0,06(730), *P* = 0.10
Adj. α	0.050	0.0375	0.050	0.050	0.0250	0.0250			0.050	0.0375

Last line indicates α level that indicates statistical significance after adjustment for multiple comparisons with Benjamini–Hochberg (FDR < 5%)

Table S3 Correlation analyses between hippocampal subregional volumetric measures and clinical scores in SNAP

SNAP										
	MMSE		**CDR**		**NIPQ**		**GDS**		**FAQ**	
	Left	**Right**	**Left**	**Right**	**Left**	**Right**	**Left**	**Right**	**Left**	**Right**
	r(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*
Pos HPC/eTIV	0,26(213), *P* < 0.001	0,19(213), *P* = 0.004	-0,21(213), *P* = 0.002	-0,11(213), *P* = 0.10	-0,05(177), *P* = 0.50	-0,05(177), *P* = 0.48	0,00(213), *P* = 0.97	-0,01(213), *P* = 0.97	-0,22(213), *P* < 0.001	-0,18(213), *P* = 0.01
Int HPC/eTIV	0,24(213), *P* < 0.001	0,11(209), *P* = 0.11	-0,19(213), *P* = 0.006	-0,13(209), *P* = 0.07	-0,07(177), *P* = 0.37	-0,08(174), *P* = 0.31	-0,05(213), *P* = 0.47	0,05(209), *P* = 0.49	-0,27(213), *P* < 0.001	-0,14(209), *P* = 0.04
Ant HPC/eTIV	0,20(212), *P* = 0.003	0,19(213), *P* = 0.007	-0,26(212), *P* < 0.001	-0,19(213), *P* = 0.005	-0,04(176), *P* = 0.60	-0,06(177), *P* = 0.42	0,03(212), *P* = 0.70	0,00(213), *P* = 0.97	-0,22(212), *P* < 0.001	-0,24(213), *P* < 0.001
Ant HPC/Pos HPC	-0,11(211), *P* = 0.12	-0,11(212), *P* = 0.10	-0,03(211), *P* =0.68	0,002(212), *P* = 0.97	0,04(175), *P* = 0.56	0,05(176), *P* = 0.49	0,02(211), *P* = 0.77	-0,03(212), *P* = 0.65	0,01(211), *P* = 0.87	0,06(212), *P* = 0.39
Adjusted sig. α	0.0375	0.0250	0.0375	0.0125					0.0375	0.0250

Last line indicates α level that indicates statistical significance after adjustment for multiple comparisons with Benjamini–Hochberg (FDR < 5%)

Table S4 Correlation analyses between hippocampal volumetric measures and CSF T-Tau, P-Tau and Aβ in controls

Controls						
	T-Tau		**P-Tau**		**Aβ**	
	Left	**Right**	**Left**	**Right**	**Left**	**Right**
	r(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*
Pos HPC/eTIV	-1,20(234), *P* = 0.07	-0,11(233), *P* = 0.10	0,06(234), *P* = 0.38	0,10(234), *P* = 0.15	-0,01(234), *P* = 0.90	-0,01(233), *P* = 0.89
Int HPC/eTIV	-0,07(232), *P* = 0.27	-0,12(231), *P* = 0.08	0,10(232), *P* = 0.15	0,08(234), *P* = 0.22	-0,01(232), *P* = 0.86	-0,09(231), *P* = 0.20
Ant HPC/eTIV	-0,05(234), *P* = 0.42	-0,12(234), *P* = 0.06	0,10(234), *P* = 0.12	0,04(234), *P* = 0.50	0,01(234), *P* = 0.88	-0,06(234), *P* = 0.34
Ant HPC/Pos HPC	0,06(234), *P* = 0.37	0,02(234), *P* = 0.72	0,04(234), *P* =0.51	-0,06(234), *P* = 0.40	0,00(234), *P* = 1.00	-0,01(234), *P* = 0.84
Adjusted sig. α						

Last line indicates α level that indicates statistical significance after adjustment for multiple comparisons with Benjamini–Hochberg (FDR < 5%)

Table S5 Correlation analyses between hippocampal volumetric measures and CSF T-Tau, P-Tau and Aβ in ADc

ADc						
	T-Tau		**P-Tau**		**Aβ**	
	Left	**Right**	**Left**	**Right**	**Left**	**Right**
	r(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*
Pos HPC/eTIV	-1,19(768), *P* = 0.001	-0,13(768), *P* < 0.001	-0,07(783), *P* = 0.04	-0,04(783), *P* = 0.10	0,18(783), *P* < 0.001	0,14(783), *P* < 0.001
Int HPC/eTIV	-0,21(767), *P* < 0.001	-0,20(765), *P* < 0.001	-0,07(782), *P* = 0.04	-0,10(780), *P* = 0.01	0,20(782), *P* < 0.001	0,17(780), *P* < 0.001
Ant HPC/eTIV	-0,12(769), *P* < 0.001	-0,16(768), *P* < 0.001	-0,02(784), *P* = 0.50	-0,06(783), *P* = 0.10	0,15(784), *P* < 0.001	0,14(783), *P* < 0.001
Ant HPC/Pos HPC	0,12(769), *P* = 0.001	0,01(767), *P* = 0.84	0,07(784), *P* =0.06	0,00(782), *P* = 0.98	-0,07(784), *P* = 0.04	-0,03(782), *P* = 0.35
Adjusted sig. α	0.05	0.0375		0.0125	0.05	0.0375

Last line indicates α level that indicates statistical significance after adjustment for multiple comparisons with Benjamini–Hochberg (FDR < 5%)

Table S6 Correlation analyses between hippocampal volumetric measures and CSF T-Tau, P-Tau and Aβ in SNAP

SNAP						
	T-Tau		**P-Tau**		**Aβ**	
	Left	**Right**	**Left**	**Right**	**Left**	**Right**
	r(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*	*r*(df), *P*
Pos HPC/eTIV	-0,15(222), *P* = 0.02	-0,05(222), *P* = 0.47	0,04(224), *P* = 0.51	0,05(224), *P* = 0.45	-0,01(224), *P* < 0.001	-0,08(224), *P* < 0.001
Int HPC/eTIV	-0,15(222), *P* = 0.02	-0,09(218), *P* = 0.18	0,03(224), *P* = 0.64	0,07(220), *P* = 0.30	-0,02(224), *P* < 0.001	0,07(220), *P* < 0.001
Ant HPC/eTIV	-0,14(220), *P* = 0.05	-0,16(222), *P* = 0.02	0,04(222), *P* = 0.52	0,05(224), *P* = 0.43	0,02(222), *P* < 0.001	-0,06(224), *P* < 0.001
Ant HPC/Pos HPC	0,03(220), *P* = 0.69	-0.08(222), *P* = 0.26	-0,03(222), *P* =0.70	-0,04(224), *P* = 0.53	0,02(222), *P* = 0.04	-0,13(224), *P* = 0.35
Adjusted sig. α	0.0250					

Last line indicates α level that indicates statistical significance after adjustment for multiple comparisons with Benjamini–Hochberg (FDR < 5%)

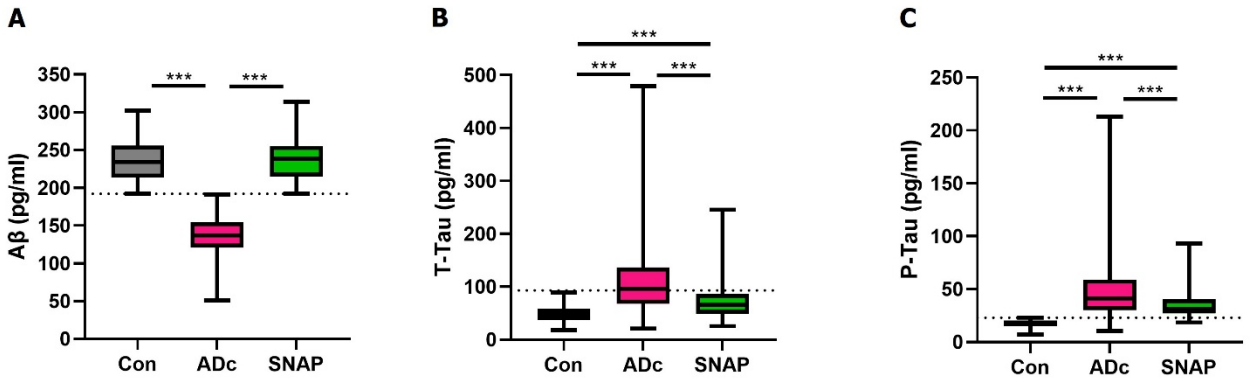

Fig. S1 Comparison of CSF Aβ, T-Tau and P-Tau levels between groups. ADc individuals show reduced Aβ levels compared with the other groups; there is no difference between controls and SNAP in Aβ (A) ($F(2,1239) = 2210.50$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.46$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test). The three groups differ significantly from each other in both T-Tau (B) ($F(2,1222) = 154.22$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P < 0.001$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test) and P-Tau (C) ($F(2,1239) = 185.38$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P < 0.001$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test). ***$P < 0.001$

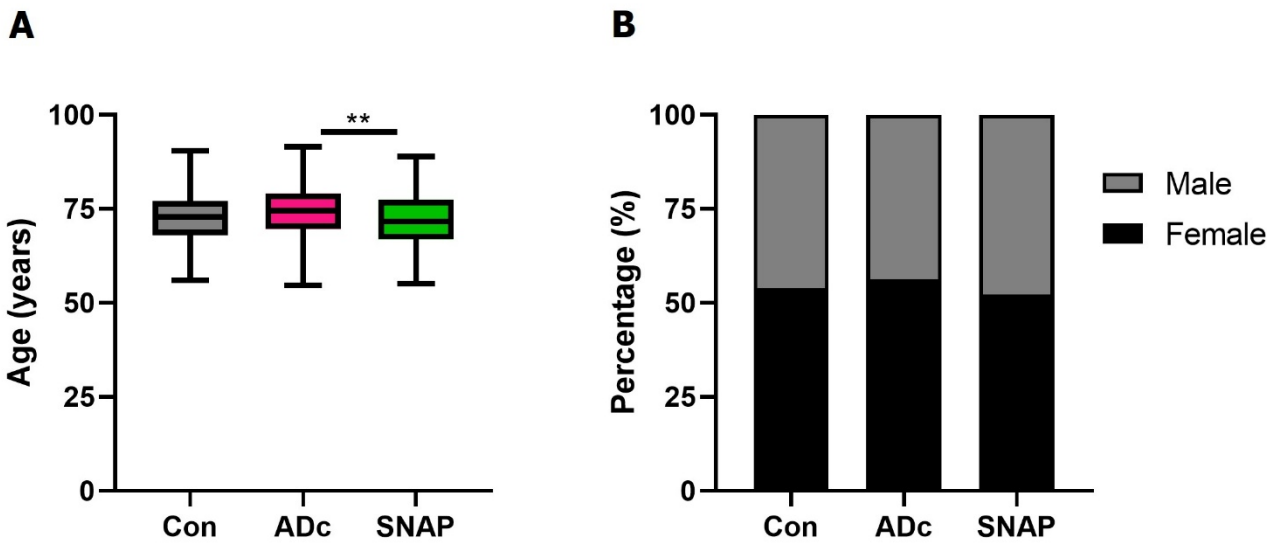

Fig. S2 Age and sex proportion characterization. ADc has increased age compared to SNAP; no other age difference is found between groups (A) ($F(2,1239) = 6.98$, $P < 0.001$, ANOVA; control vs ADc $P < 0.08$, control vs SNAP $P < 0.58$, ADc vs SNAP $P = 0.002$, Tukey's multiple comparisons test). No differences were found in sex proportions between groups (B) ($X^2(2,N = 1242) = 1.31$, $P = 0.52$. $^{**}P < 0.01$

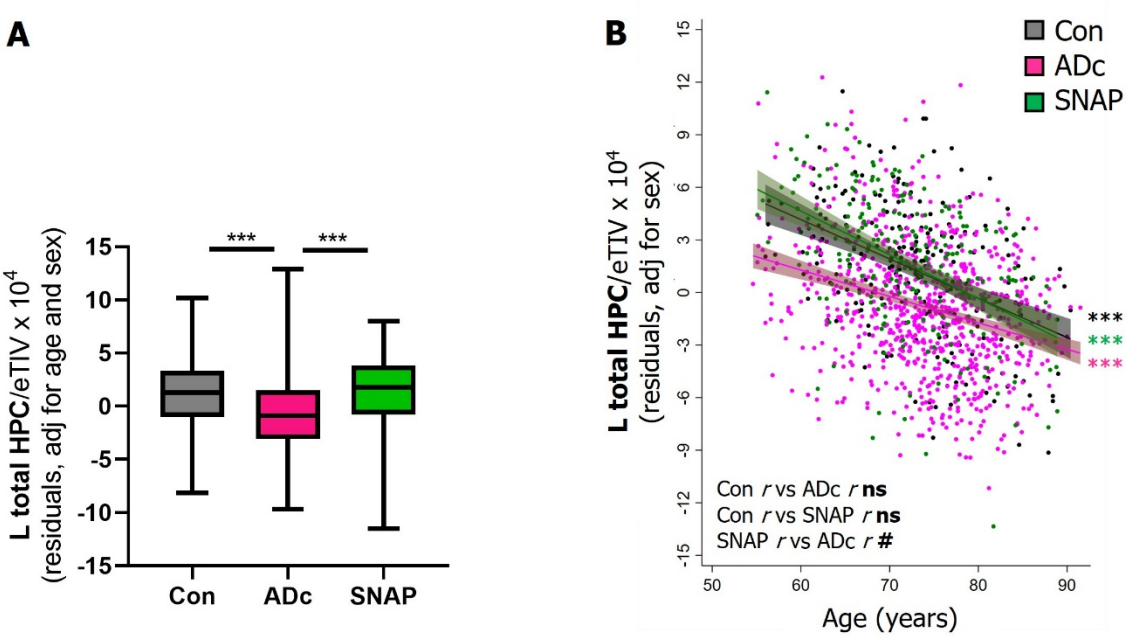

Fig. S3 Comparison of total left hippocampus volume between groups. Controlling for age, sex and eTIV, ADc show significantly diminished volumes of the left hippocampus (HPC) compared to controls and SNAP (A) ($F(2,1239) = 47.34$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.81$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test). Adjusting for sex and eTIV, the three groups show a significant decrease of the left HPC volume with age (B) (control $r(232) = -0.43$, $P < 0.001$; ADc $r(782) = -0.30$, $P < 0.001$; SNAP $r(222) = -0.48$, $P < 0.001$) - ADc correlation is significantly different from SNAP (control vs ADc $X^2(1,N = 1018) = 4.27$, $P = 0.04$; control vs SNAP $X^2(1,N = 458) = 0.41$, $P = 0.52$; ADc vs SNAP $X^2(1,N = 1008) = 7.58$, $P = 0.006$, Jennrich test). # $P < 0.01(6)$; ***$P < 0.001$; ns, non-significant; L, left

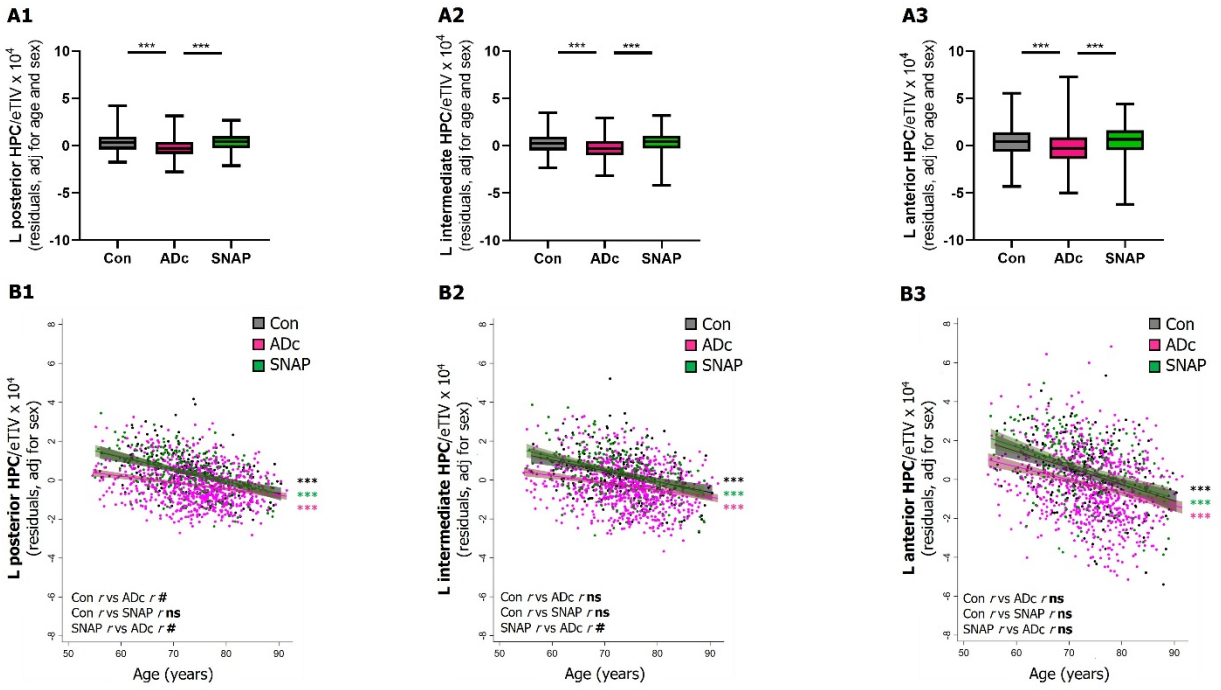

Fig. S4 Subregional left hippocampal volumes normalized to eTIV comparisons between groups. On the left hemisphere, controlling for eTIV, age and sex, ADc show decreased posterior (A1) ($F(2,1238) = 52.98$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.98$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test), intermediate (A2) ($F(2,1235) = 36.37$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.82$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test) and anterior volumes (A3) (($F(2,1237) = 21.12$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.57$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test) compared to the other groups. Over age, adjusting for sex and eTIV, the three groups reveal a significant decrease of the left posterior (B1) (control $r(232) = -0.41$, $P < 0.001$; ADc $r(781) = -0.24$, $P < 0.001$; SNAP $r(222) = -0.46$, $P < 0.001$), intermediate (B2) (control $r(231) = -0.33$, $P < 0.001$; ADc $r(780) = -0.23$, $P < 0.001$; SNAP $r(221) = -0.41$, $P < 0.001$), and anterior hippocampal (HPC) volume (B3) (control $r(232) = -0.36$, $P < 0.001$; ADc $r(782) = -0.27$, $P < 0.001$; SNAP $r(220) = -0.40$, $P < 0.001$). ADc correlation with age is significantly different from the remaining groups in posterior HPC volume (control vs ADc $X^2(1,N = 1017) = 6.56$, $P = 0.01$; control vs SNAP $X^2(1,N = 455) = 0.41$, $P = 0.52$; ADc vs SNAP $X^2(1,N = 1005) = 10.43$, $P = 0.001$, Jennrich test) and from SNAP in intermediate HPC (control vs ADc $X^2(1,N = 1015) = 1.91$, $P = 0.17$; control vs

SNAP $X^2(1,N = 456) = 0.99$, $P = 0.32$; ADc vs SNAP $X^2(1,N = 1005) = 6.34$, $P = 0.01$, Jennrich test), with no difference between correlations in anterior HPC (control vs ADc $X^2(1,N = 1018) = 1.54$, $P = 0.21$; control vs SNAP $X^2(1,N = 455) = 0.31$, $P = 0.58$; ADc vs SNAP $X^2(1,N = 1005) = 3.50$, $P = 0.06$, Jennrich test). # $P < 0.025$; ***$P < 0.001$; ns, non-significant; L, left

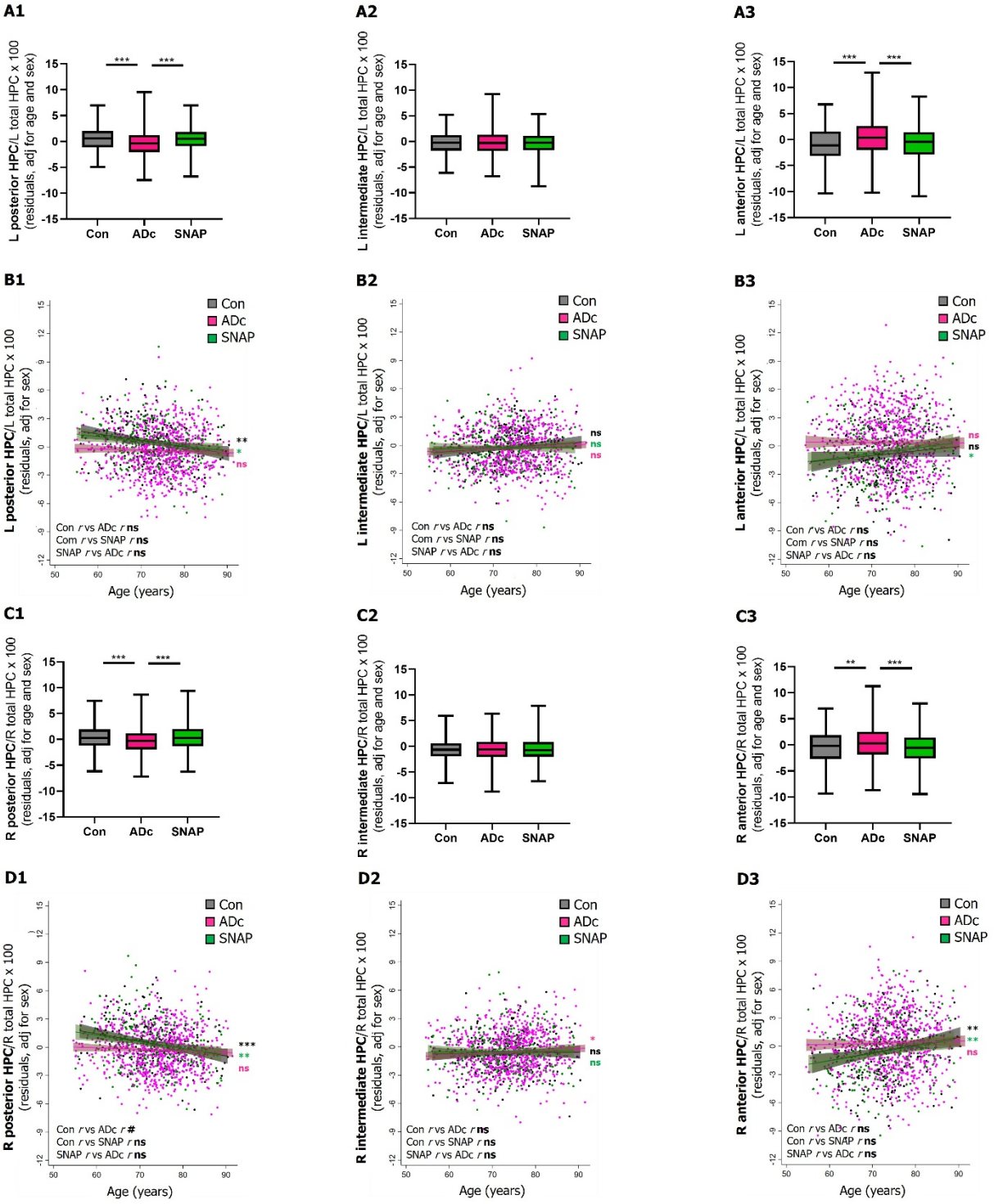

Fig. S5 Comparisons between groups of subregional hippocampal volumes normalized for ipsilateral total hippocampal volume. On the left hemisphere, controlling for total left hippocampal (HPC) volume, age and sex, ADc show decreased posterior (A1) ($F(2,1235) = 52.98$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.94$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test) and increased anterior volumes (A3) (($F(2,1237) = 16.62$, $P < 0.001$, ANOVA;

control vs ADc $P < 0.001$, control vs SNAP $P = 0.75$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test) compared to the other groups, with no difference in intermediate HPC (A2) ((F(2,1233) = 0.03, $P = 0.97$, ANOVA). Over age, adjusting for sex and left total HPC volume, there is significant decrease of the left posterior HPC in controls and SNAP, with no significant change in ADc (B1) (control $r(232) = -0.21$, $P < 0.001$; ADc $r(779) = -0.04$, $P = 0.28$; SNAP $r(222) = -0.16$, $P = 0.01$); no significant changes of intermediate HPC volume are seen in any group (B2) (control $r(230) = 0.11$, $P = 0.09$; ADc $r(779) = 0.07$, $P = 0.06$; SNAP $r(221) = 0.02$, $P = 0.72$); anterior HPC volume has a positive significant correlation with age in SNAP, with no significant correlation identified in the other groups (B3) (control $r(232) = 0.10$, $P = 0.12$; ADc $r(782) = -0.01$, $P = 0.84$; SNAP $r(220) = 0.14$, $P = 0.03$) – there are no significant differences between groups's correlations for these subregions (Posterior HPC: control vs ADc $X^2(1,N = 1015) = 5.56$, $P = 0.01$; control vs SNAP $X^2(1,N = 458) = 0.30$, $P = 0.58$; ADc vs SNAP $X^2(1,N = 1005) = 2.76$, $P = 0.10$; Intermediate HPC: control vs ADc $X^2(1,N = 1013) = 0.40$, $P = 0.53$; control vs SNAP $X^2(1,N = 453) = 0.92$, $P = 0.34$; ADc vs SNAP $X^2(1,N = 1004) = 0.32$, $P = 0.57$; Anterior HPC: control vs ADc $X^2(1,N = 1018) = 2.16$, $P = 0.14$; control vs SNAP $X^2(1,N = 456) = 0.18$, $P = 0.67$; ADc vs SNAP $X^2(1,N = 1006) = 3.84$, $P = 0.05$, Jennrich test). On the right hemisphere, ADc has reduced posterior (C1) ($F(2,1237) = 11.44$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P > 0.99$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test) and greater anterior volumes (C3) ((F(2,1237) = 9.83, $P < 0.001$, ANOVA; control vs ADc $P = 0.003$, control vs SNAP $P = 0.93$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test) compared to the other groups; no differences are seen in intermediate HPC (C2) ((F(2,1223) = 0.39, $P = 0.68$, ANOVA). There is significant decrease of the right posterior HPC in controls and SNAP, with no significant change in ADc (D1) (control $r(232) = -0.24$, $P < 0.001$; ADc $r(780) = -0.05$, $P = 0.15$; SNAP $r(222) = -0.21$, $P = 0.02$); ADc has a significant increase in the intermediate HPC volume ratio by ipsilateral total HPC volume over age, whereas no significant correlations are revealed in the other groups (D2) (control $r(228) = 0.02$, $P = 0.76$; ADc $r(776) = 0.08$, $P = 0.04$; SNAP $r(216) = 0.02$, $P = 0.82$); anterior HPC volume has a positive significant correlation with age in controls and SNAP, with no significant correlation identified in ADc (D3) (control $r(232) = 0.19$, $P = 0.004$; ADc $r(780) = 0.03$, $P = 0.47$; SNAP $r(222) = 0.19$, $P = 0.005$) – ADc has a

significantly weaker correlation compared to controls for posterior right HPC, with no other differences found between the remaining correlations (Posterior HPC: control vs ADc $X^2(1,N = 1016) = 6.24$, $P = 0.01$; control vs SNAP $X^2(1,N = 458) = 0.11$, $P = 0.74$; ADc vs SNAP $X^2(1,N = 1006) = 4.24$, $P = 0.04$; Intermediate HPC: control vs ADc $X^2(1,N = 1008) = 0.53$, $P = 0.47$; control vs SNAP $X^2(1,N = 448) < 0.01$, $P = 0.96$; ADc vs SNAP $X^2(1,N = 1004) = 0.61$, $P = 0.43$; Anterior HPC: control vs ADc $X^2(1,N = 1016) = 4.72$, $P = 0.03$; control vs SNAP $X^2(1,N = 458) < 0.01$, $P = 0.99$; ADc vs SNAP $X^2(1,N = 1006) = 4.64$, $P = 0.03$, Jennrich test). # $P < 0.01(6)$; *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$; ns, non-significant; L, left; R, right

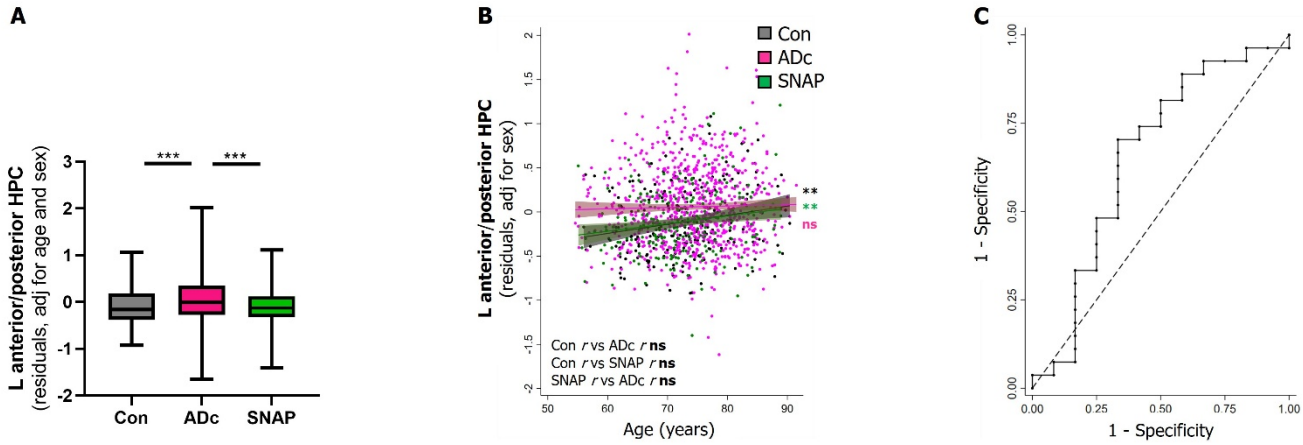

Fig. S6 Anterior/posterior left hippocampal volume ratio compared between groups. Adjusting for total left hippocampal (HPC) volume, age and sex, ADc show increased ratio of anterior HPC volume divided by posterior HPC volume on the left (A) ($F(2,1237) = 20.03$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P > 0.99$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test). With aging, controlling for sex, there is significant increase of this ratio in controls and SNAP, with no significant change in ADc (B) (control $r(232) = 0.19$, $P = 0.004$; ADc $r(782) = 0.03$, $P = 0.48$; SNAP $r(220) = 0.18$, $P = 0.009$) – there are no significant differences between groups's correlations on the left (control vs ADc $X^2(1,N = 1018) = 4.88$, $P = 0.03$; control vs SNAP $X^2(1,N = 456) = 0.02$, $P = 0.88$; ADc vs SNAP $X^2(1,N = 1006) = 3.92$, $P = 0.05$, Jennrich test). AUC of ROC using left anterior HPC volume/posterior HPC volume as predictor of ADc versus SNAP is estimated at 0.65 (C). $^{**}P < 0.01$; $^{***}P < 0.001$; ns, non-significant; L, left

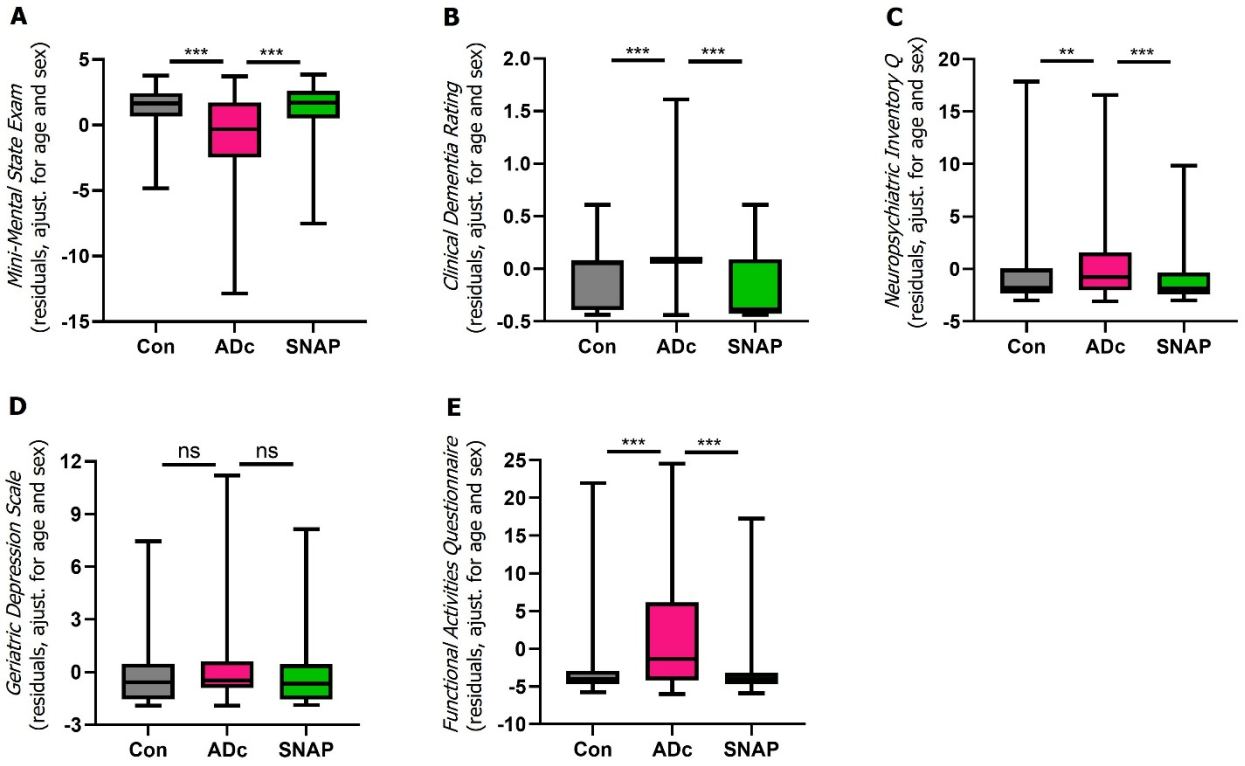

Fig. S7 Comparison between groups for various clinical scores. In all of these analyses, adjustment for age and sex was performed. Compared to controls and SNAP, ADc show decreased mini-mental state exam score (A), increased clinical dementia rating (B) and increased neuropsychiatric inventory Q score (C). There is no difference between groups in geriatric depression scale (D). ADc show increased functional activities questionnaire score compared to controls and SNAP (E). $^{**}P < 0.01$, $^{***}P < 0.001$; ns, non-significant

FIGURE LEGENDS (with complete statistical information)

Fig. 1 Comparison of total right hippocampus volume between groups. Controlling for age, sex and eTIV, ADc show significantly diminished volumes of the right hippocampus (HPC) compared to controls and SNAP (A) ($F(2,1238) = 46.70$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.38$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test). Adjusting for sex and eTIV, the three groups show a significant decrease of the right HPC volume with age (B) (control $r(232) = -0.47$, $P < 0.001$; ADc $r(781) = -0.26$, $P < 0.001$; SNAP $r(222) = -0.54$, $P < 0.001$) - ADc correlation is significantly different from the other groups (control vs ADc $X^2(1,N = 1017) = 9.23$, $P = 0.002$; control vs SNAP $X^2(1,N = 458) = 1.05$, $P = 0.30$; ADc vs SNAP $X^2(1,N = 1007) = 16.61$, $P < 0.001$, Jennrich test). # $P < 0.01(6)$; ***$P < 0.001$; ns, non-significant; R, right

Fig. 2 Subregional right hippocampal volumes normalized to eTIV comparisons between groups. On the right hemisphere, ADc displays reduced volume of posterior (A1) ($F(2,1237) = 43.78$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.52$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test), intermediate (A2) ($F(2,1228) = 32.98$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.23$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test) and anterior hippocampus (HPC) (A3) ($F(2,1238) = 27.71$, $P < 0.001$, ANOVA; control vs ADc $P < 0.001$, control vs SNAP $P = 0.47$, ADc vs SNAP $P < 0.001$, Tukey's multiple comparisons test)). The three groups have a significant decrease of the right posterior (B1) (control $r(232) = -0.46$, $P < 0.001$; ADc $r(781) = -0.22$, $P < 0.001$; SNAP $r(222) = -0.50$, $P < 0.001$), intermediate (B2) (control $r(229) = -0.40$, $P < 0.001$; ADc $r(778) = -0.21$, $P < 0.001$; SNAP $r(218) = -0.47$, $P < 0.001$), and anterior HPC volume (B3) (control $r(232) = -0.37$, $P < 0.001$; ADc $r(781) = -0.23$, $P < 0.001$; SNAP $r(222) = -0.44$, $P < 0.001$). ADc correlation with age is significantly different from the remaining groups in posterior HPC volume (control vs ADc $X^2(1,N = 1017) = 11.22$, $P < 0.001$; control vs SNAP

$X^2(1,N = 458) = 0.31$, $P = 0.57$; ADc vs SNAP $X^2(1,N = 1007) = 15.15$, $P < 0.001$, Jennrich test) and in intermediate HPC (control vs ADc $X^2(1,N = 1011) = 7.25$, $P = 0.007$; control vs SNAP $X^2(1,N = 451) = 0.89$, $P = 0.34$; ADc vs SNAP $X^2(1,N = 1000) = 13.58$, $P < 0.001$, Jennrich test); in anterior HPC, it is different from SNAP (control vs ADc $X^2(1,N = 1017) = 4.13$, $P = 0.04$; control vs SNAP $X^2(1,N = 458) = 0.79$, $P = 0.37$; ADc vs SNAP $X^2(1,N = 1007) = 9.04$, $P = 0.003$, Jennrich test). # $P < 0.025$; ***$P < 0.001$; ns, non-significant; R, right

Fig. 3 Anterior/posterior right hippocampal volume ratio compared between groups. On the right hippocampus (HPC), ADc also display increased anterior/posterior HPC volume ration compared to the other groups (A) ($F(2,1237) = 9.84$, $P < 0.001$, ANOVA; control vs ADc $P = 0.001$, control vs SNAP $P > 0.99$, ADc vs SNAP $P = 0.002$, Tukey's multiple comparisons test). Over age and controlling for sex, there is significant increase of this ratio in controls and SNAP, with no significant change in ADc (B) (control $r(232) = 0.23$, $P < 0.001$; ADc $r(780) = 0.05$, $P = 0.16$; SNAP $r(220) = 0.20$, $P = 0.002$) – that variation is significantly different between controls and ADc (control vs ADc $X^2(1,N = 1016) = 5.99$, $P = 0.01$; control vs SNAP $X^2(1,N = 456) = 0.11$, $P = 0.75$; ADc vs SNAP $X^2(1,N = 1006) = 4.06$, $P = 0.04$, Jennrich test). AUC of ROC for the right ratio to distinguish ADc from SNAP is estimated at 0.70 (C). # $P < 0.01(6)$; **$P < 0.01$; ***$P < 0.001$; ns, non-significant; R, right

Fig. 4 Correlation analyses between hippocampal subregional volumetric measures and various clinical scores. In all of these analyses, adjustment for age and sex was performed. Only significant results are colored, after correction for multiple comparisons with Benjamini-Hochberg method (FDR < 5%). Color and brightness indicate magnitude of Pearson coefficient *r* according to the color code displayed. Controls, ADc and SNAP show various significant correlations between hippocampal (HPC) subregional metrics and mini-mental state exam score, clinical dementia rating and functional activities questionnaire score; no significant correlations were found with geriatric depression scale;

ADc is the only group in which there are significant correlations with neuropsychiatric inventory Q score. Refer to Supplementary Tables 1, 2 and 3 for detailed Pearson coefficients, corresponding *P* values and adjusted alpha level that indicates statistical significance. MMSE, Mini-Mental State Exam, CDR, Clinical Dementia Rating; NPI-Q, Neuropsychiatric Inventory Q; GDR, Geriatric Depression Scale; FAQ, Functional Activities Questionnaire

Fig. 5 Heat map of correlation analyses (*r*) between hippocampal subregional volumetric measures and CSF levels of T-Tau, P-Tau and Aβ, for controls (A), ADc (B) and SNAP (C). Adjustment for age and Benjamini-Hochberg method (FDR < 5%) was used to control for multiple comparisons. Only significant results are colored, according to the color code displayed. Refer to Supplementary Tables 4, 5 and 6 for detailed Pearson coefficients, corresponding *P* values and adjusted alpha level that indicates statistical significance