

Table S1. Coefficients and Intercepts of the Primary 11 Organ-Specific Biological Aging Models

Proteins	Adipose	Artery	Brain	Heart	Immune	Intestine	Kidney	Liver	Lung	Muscle	Pancreas
Intercept	57.10442287	57.33416927	57.01872515	57.36057383	57.69160915	57.38158079	57.10864406	57.60600188	57.22967171	57.20020085	56.84863064
A1BG								4.596224754			
ABCA2			0.605362473								
ACAN		-1.088480517									
ADAM22			1.261916504								
ADAM8					-0.41571578						
ADCYAP1R1			-0.414915459								
ADGRE1					-0.624812898						
ADGRE2					4.56296169						
ADH4								0.400038676			
ADIPOQ	1.277740457										
AFM								4.203449015			
AGER									-1.073441037		
AGT								-0.102183277			
AGXT								-0.564591225			
AHSG								-2.025868386			
AHSP					0.122731408						
AIF1					0.210083974						
AKR1C4								-0.063155688			
ALPI						-0.11973475					
ALPP									-0.131233637		
AMBN			-0.452049313								
AMBP								4.689806727			
AMY1A_AMY1B_AMY1C											0.687407095

AMY2A											-0.03889124 6
ANG								-0.77274325 5			
ANGPTL3								0.042750748			
ANGPTL7			0.315780752								
APBB1IP					0.672532913						
APCS								-0.34108372 3			
APLP1			-0.12602840 4								
APOA1								3.499231221			
APOA2								1.0352484			
APOA4						-0.30760885 8					
APOC1								-1.70339218 1			
APOD			0.220025845								
APOF								2.772780527			
APOH								0.044141383			
ARHGAP30					-0.24637910 2						
ASGR1								-0.06816018 7			
ASGR2								-2.11525423 4			
ATP1B2			-0.21632291 4								
ATP1B4										0.153110193	
ATP6V1G2			-0.03056818 6								
AZU1					0.132850091						
BCAN			-5.15651076								
BGN		-0.20564697 2									
BIN2					-0.26588039 2						
BMP10				2.279732757							
BSND							-0.04570694 4				

BST1					-0.12207994 6						
C1QL2			-1.50902437 4								
C2								-0.20175504 1			
C4BPB								0.687974004			
C5								0.334279847			
C8B								0.110447273			
C9								0.433020783			
CA11			-0.15125964 6								
CA14			-2.61177896 9								
CA3										0.666587086	
CA5A								-0.21641779 6			
CA7						-0.33940085					
CBLN1			-0.08117304 3								
CCL16								0.578844176			
CCL18									1.271520375		
CCL25						1.139622132					
CCL5					-0.16542855 8						
CD177					0.026711305						
CD244					-0.36371022 1						
CD300A					0.436014272						
CD300LG	0.35969735										
CD5L					0.191395374						
CD7					-1.12312214 7						
CD72					0.831976218						
CD8A					-2.26621249 7						
CDH17						-0.43778918 7					

CDH22			0.062245698								
CDHR2						1.383385075					
CDHR5						-1.22073273 7					
CEACAM18						-0.16281719 6					
CEACAM20						0.163911773					
CEACAM21					-0.17975778 8						
CEACAM3					-0.2765483						
CEACAM8					0.926093655						
CELA2A											-0.62913760 8
CELA3A											0.128135208
CEND1			0.13927402								
CFB								-0.78940541 8			
CFHR2								0.094221119			
CFHR4								0.071904006			
CFHR5								-0.38434620 5			
CFP					-0.05898878 7						
CLC					0.622225725						
CLEC12A					0.878573985						
CLEC2L			-0.29904646 3								
CLEC4D					0.184026459						
CLEC4M								0.269775884			
CLPS											-0.02190972 4
CNDP1			-0.05548484 3								
CNP			-0.68430236 2								
CNTF			-0.08218307 3								
CNTN1			0.996251518								

CNTN2			0.502561665								
CNTNAP2			-0.26461909								
CNTNAP4			0.07025442								
CORO1A					-0.03598169						
CPA1											0.297427521
CPA2											0.060485662
CPB1											0.175137608
CPB2								2.778425022			
CPLX2			0.014656114								
CPPED1					-0.30894025						
CR1					-0.36731591						
CRH			-0.12501816								
CRLF1		-3.45330152									
CRTAM			0.311691437								
CSF1R					-0.96666839						
CSF2									0.492010461		
CSF2RA					0.037404865						
CSF2RB					-0.20672727						
CSF3R					-0.74239480						
CSPG5			-0.08908545								
CST7					-0.16852746						
CTRB1											-0.74475975
CTRC											0.063293161
CTRL											-0.33750865
CUZD1											-0.93654649
CXCL1					-0.05497552						

CXCL13					0.307345487						
CXCL6					0.300063872						
CYP24A1							-0.035859495				
CYTL1		-3.314380486									
DCXR								0.658947362			
DEFA1_DEFA1B					0.421768153						
DHODH								0.016566393			
DNAJC6			-0.009374842								
DNM1			-0.112730419								
DNM3			0.2827593								
DPEP2					0.56692572						
DUSP29										0.215263303	
EGLN1										1.018973538	
ELAVL4			-0.034229677								
ELN		6.946337091									
ENO2			0.261969124								
ENO3										-1.827593823	
ENOPH1			-0.000786194								
ENPP6			-0.745863968								
EPO								-0.098336794			
EVI2B					0.29777113						
EXTL1			0.141809333								
F11								0.247763525			
F12								-0.145371788			
F13B								0.095572622			
F2								-2.542046423			
F7								-0.97903496			

								8			
F9								2.233973229			
FABP2						-0.50932387 2					
FABP4	2.817328572										
FABP6						0.084044671					
FASLG					-3.68887622 5						
FCAR					0.088822473						
FCGR2A					0.188899553						
FCGR3B					-0.72623559 9						
FCN1					0.564351706						
FCRL6					0.438592781						
FETUB								-2.28041713 6			
FGA								4.921460768			
FGD3					-0.10663187 7						
FGF21								0.045012341			
FGF3			-0.14839069 1								
FGF6									0.116974259		
FGL1								0.217947149			
FGR					-0.12209112 8						
FKBP1B			0.41242946								
FMNL1					-0.52118284 5						
FOLR3					-0.00653488 9						
FRZB		0.528933758									
FYB1					0.523863423						
GABRA4			-0.03739914 1								
GAD1			-0.05556267 9								
GAD2			0.011850905								

GC								-0.47721366 3			
GCG											-0.39300977 7
GDF2								-0.79407894 4			
GFAP			3.261818096								
GMFG					1.275468381						
GNLY					0.820850783						
GP2											0.858649578
GPA33							-0.06388256 2				
GPC5			0.069034433								
GPR101			-0.00512990 5								
GPR158			0.187564193								
GPR37			-0.26749584 8								
GRIK2			0.437901512								
GRIN2B			-0.08748562 1								
GUCA2A						2.916261602					
GUCY2C						-0.29639731 1					
GZMA					0.419008093						
GZMB					-0.38600069 9						
GZMH					0.28314437						
HAO1								0.089407919			
HAVCR1							4.392626195				
HBQ1					-0.61715519 3						
HCLS1					-0.47434495 7						
HGFAC								0.848338655			
HMOX1					0.72701576						
HRG								0.996890735			
HSD11B1								-1.12655908			

								8			
HTR1A			-0.07345422 6								
ICAM3					0.417453881						
IDI2										0.51854362	
IDS			-1.70989600 2								
IGFBP1								0.248875569			
IGLON5			-0.05886738 3								
IGSF21			-0.64461071 5								
IL17RA					-0.14568778 5						
IL18RAP					-0.24558067 9						
IL1R2					-3.34437772 3						
IL2RB					-0.13786041 8						
IL2RG					0.238128208						
IL9			0.040048293								
IMPG1			-0.19976508 3								
INHBC								0.174937776			
INSL5						-0.10913505 5					
ITGAM					-1.86072486 4						
ITGB1BP2				-0.09085208 6							
ITGB2					3.145627325						
ITGB6							-0.15523703 3				
ITGBL1		1.546393067									
ITIH1								0.638013488			
ITIH3								1.672870677			
ITIH4								-3.20864856 3			
KCNIP4			-0.16108193 8								

KIAA1549L			-0.08127995 8								
KIR2DL3					0.432946177						
KIR2DS4					0.013133534						
KIR3DL1					-0.01303356 9						
KIR3DL2					-0.13922386 1						
KIRREL2										-0.38032617 7	
KLHL41									-1.35846871 4		
KLK1										0.434827961	
KLKB1							-0.62689222 1				
KLRF1					1.099855063						
LAMP3								2.22965827			
LAT2					-0.26716470 9						
LBP							-0.26381151				
LCN15			0.159883395								
LCP1					-0.3115564						
LECT2							3.853973471				
LEP	-0.80167570 6										
LGALS4						1.724375171					
LHPP			-0.27265266 2								
LILRA2					1.475981343						
LILRA5					-0.72801910 9						
LILRA6					0						
LILRB1					-0.63551239						
LILRB2					1.222284382						
LPA							-0.03514252 9				
LRFN2			-0.29032825								
LRRC25					-0.40001355						

					8						
LRTM1					-0.34854865 6						
LRTM2			-0.63037581 3								
LTBP2		4.522485753									
LYN					-0.38814303						
LYPD8						0.004806948					
MAG			0.089056713								
MAP2			-0.26759360 7								
MAPK9			0.294251684								
MBL2								-0.06990525 4			
MCEMP1					0.049513823						
MDGA1			0.00287404								
MEGF10			-0.62654260 4								
MEGF11			-0.26914492 7								
MEP1A						0.283111656					
MEP1B						0.349633295					
MEPE			-2.34372373 2								
MFGE8		-0.45455412 5									
MLN						1.779186101					
MMP8					-0.08250618 1						
MMP9					1.233082338						
MNDA					-0.17987952 4						
MOG			6.461411077								
MPO					-0.12678623 6						
MST1								-0.18650041 6			
MUC13						-0.49719200 3					

MUC2						0.574574266					
MYBPC1										3.738397168	
MYBPC2										-0.447609812	
MYH4										0.015232721	
MYL1										-0.354370943	
MYL4				0.457942959							
MYLPF										-0.766497958	
MZB1					-1.546537366						
MZT1			-0.470988634								
NCAN			-1.102393514								
NCF2					-0.292094835						
NCR1					1.085928589						
NEB										-0.17652456	
NEFL			3.714864049								
NFE2					-0.001927002						
NGFR			-0.129833512								
NMRK2				-0.665021756							
NPHS2							-0.061289335				
NPPB				1.180801923							
NPTX1			0.363255762								
NPTXR			-0.631913082								
NRGN			-0.161784474								
NRXN3			0.187994571								
NXPE4						-0.305786169					
OMG			0.930850269								
ORM1								-2.06092322			

OSM					-1.81462198 3						
OSTN			0.401847409								
OXT			-0.26231943								
PACS2			0.156194466								
PADI4					0.578307104						
PDZK1							-1.27196354 8				
PENK			1.256966621								
PF4					0.5561926						
PGLYRP1					0.477184452						
PGLYRP2								-0.09946131 3			
PILRA					1.259329628						
PLA2G1B											-1.34487634 5
PLG								-3.10759476 4			
PLIN1	0.963173155										
PMCH			-0.10326377								
PNLIP											0.294690197
PNLIPRP1											-0.06351211 7
PNLIPRP2											-0.00956338 1
PNMA2			0.091125799								
POLR2F			-0.17300555 1								
PON1								-0.92878585 9			
PON3								-1.02542987 6			
PPBP					0.031168678						
PPP1R14D							-0.50305785 9				
PPP3R1			0.434231935								
PPY											1.150115945
PRG2					1.78734305						

PRG3					-1.78649262 2						
PRKAG3										0.631262076	
PROC								1.417535084			
PRSS2											1.864715972
PRTN3					-1.26845831 9						
PSTPIP2					1.017994701						
PTH1R							0.719126446				
PTPRC					1.031026742						
PTPRR			-6.03761857 8								
PTPRZ1			4.091940723								
PVALB			0.051104464								
PXDNL				0.090366212							
PYY						0.065538161					
PZP								-0.29025168 6			
QDPR			-1.13884287 7								
RAB6B			-0.16750825 2								
RASGRF1			0.060534218								
RBP2						-0.34615215 7					
REG1A											1.372858693
REG1B											0.398698623
REG3G											-0.50751190 1
REG4						1.342564322					
REN							0.561347651				
RETN					-0.00748321 2						
RGS8			-0.08977655 4								
RNASE3					0.100312789						
RNF149					1.593533399						

RTN4R			0.195880475								
RYR1										0.17466105	
S100A12					0.479589211						
S100G						0.618520859					
SAA4								-1.20769769 7			
SCGB1A1									2.362742701		
SCGB3A2									0.217150673		
SCN2A			0.018871515								
SCN2B			0.207875968								
SCN4B			0.219838945								
SCRN1			0.363567063								
SEL1L											1.657784895
SELL					-4.28437026 4						
SELPLG					1.168217907						
SEPTIN3			0.521362083								
SEPTIN8			2.945132224								
SERPINA1								1.605607711			
SERPINA11								0.795663364			
SERPINA6								-0.33822678 8			
SERPINA7								-0.75905114 3			
SERPINC1								-4.93757461 1			
SERPIND1								-1.26435198 1			
SERPINF2								-5.14738493 5			
SERPINI1			-0.60657933 8								
SERPINI2											-1.69738181 1
SEZ6			0.107600911								
SEZ6L			-0.44231969 8								

SFTP A1									0.099921941		
SFTP A2									0.226223478		
SFTPD									1.068497848		
SIGLEC5					-0.03632534 5						
SIGLEC7					3.264428279						
SIGLEC9					0.013332635						
SIRPB1					-0.07429632 5						
SLA2					-0.92682079 8						
SLC51B						0.135212391					
SLITRK1			0.210025517								
SNAP25			-0.82457390 3								
SOD2										-0.96369354 4	
SOST		1.639997709									
SOWAHA			0.012649712								
SPINK1											1.802758667
SPINK4						0.324839726					
SPOCK1			2.796271076								
STAB2					-0.28047501 6						
STX1B			0.101461732								
SUSD5		2.393400956									
SV2A			-0.32103106 5								
SYT1			0.26353086								
TAGLN3			-0.03383899 2								
TARM1					-0.08392056 4						
TBR1			-0.02257659 3								
TDO2									-0.40341131 9		
THBS2		-3.43160919									

		1									
TLR1					0.103213579						
TMOD4										-0.14070492 6	
TMPRSS15						-0.13888895 4					
TMPRSS5			0.354217199								
TNFAIP8L2					-0.29076804 2						
TNFRSF10C					0.263351467						
TNFRSF11B		3.546582396									
TNFRSF1B					0.440405743						
TNNI3				0.319165207							
TNR			-0.51321008 1								
TPM3										-0.62993107 6	
TREML1					0.182166088						
TREML2					-2.40629017 6						
TSPAN7			-0.04832473 2								
TTN										-0.15146240 6	
TTR								2.113793201			
TUBB3			0.100422919								
UMOD							-0.38425536 8				
UPB1								-0.42165323 7			
VCAN		-0.30732842 1									
VIPR1										-0.79049150 9	
VNN2					0.2962494						
VSIR					-0.40337677 8						
VSNL1			-0.02182819 3								
VSTM1					-0.39190505 5						

VSTM2B			$-\frac{0.12677478}{2}$								
VWC2L			0.14775791								
WAS					$-\frac{0.02385250}{4}$						

Table S2. Coefficients and Intercepts of the 11 Organ-Specific Biological Aging Models Trained with Elastic Net Regression to Predict Chronological Age

Model	Adipose	Artery	Brain	Heart	Immune	Intestine	Kidney	Liver	Lung	Muscle	Pancreas
Intercept	57.1044228 7	57.3341692 7	57.0187251 5	57.3605738 3	57.6916091 5	57.3815807 9	57.1086440 6	57.6060018 8	57.2296717 1	57.2002008 5	56.8486306 4
A1BG								4.59622475 4			
ABCA2			0.60536247 3								
ACAN		-1.0884805 17									
ADAM22			1.26191650 4								
ADAM8					-0.4157157 8						
ADCYAP1R1			-0.4149154 59								
ADGRE1					-0.6248128 98						
ADGRE2					4.56296169						
ADH4								0.40003867 6			
ADIPOQ	1.27774045 7										
AFM								4.20344901 5			
AGER									-1.0734410 37		
AGT								-0.1021832 77			
AGXT								-0.5645912 25			
AHSG								-2.0258683 86			
AHSP					0.12273140 8						
AIF1					0.21008397 4						
AKR1C4								-0.0631556 88			
ALPI						-0.1197347 5					
ALPP									-0.1312336 37		
AMBN			-0.4520493 13								
AMBP								4.68980672 7			

AMY1A_AMY1B_AMY1C											0.687407095
AMY2A											-0.038891246
ANG								-0.772743255			
ANGPTL3								0.042750748			
ANGPTL7			0.315780752								
APBB1IP					0.672532913						
APCS								-0.341083723			
APLP1			-0.126028404								
APOA1								3.499231221			
APOA2								1.0352484			
APOA4						-0.307608858					
APOC1								-1.703392181			
APOD			0.220025845								
APOF								2.772780527			
APOH								0.044141383			
ARHGAP30					-0.246379102						
ASGR1								-0.068160187			
ASGR2								-2.115254234			
ATP1B2			-0.216322914								
ATP1B4										0.153110193	
ATP6V1G2			-0.030568186								
AZU1					0.132850091						
BCAN			-5.15651076								
BGN		-0.205646972									
BIN2					-0.265880392						

BMP10				2.27973275 7							
BSND							-0.0457069 44				
BST1					-0.1220799 46						
C1QL2			-1.5090243 74								
C2							-0.2017550 41				
C4BPB							0.68797400 4				
C5							0.33427984 7				
C8B							0.11044727 3				
C9							0.43302078 3				
CA11			-0.1512596 46								
CA14			-2.6117789 69								
CA3										0.66658708 6	
CA5A							-0.2164177 96				
CA7						-0.3394008 5					
CBLN1			-0.0811730 43								
CCL16							0.57884417 6				
CCL18									1.27152037 5		
CCL25						1.13962213 2					
CCL5					-0.1654285 58						
CD177					0.02671130 5						
CD244					-0.3637102 21						
CD300A					0.43601427 2						
CD300LG	0.35969735										
CD5L					0.19139537 4						
CD7					-1.1231221 47						

CD72					0.831976218						
CD8A					-2.266212497						
CDH17						-0.437789187					
CDH22			0.062245698								
CDHR2						1.383385075					
CDHR5						-1.220732737					
CEACAM18						-0.162817196					
CEACAM20						0.163911773					
CEACAM21					-0.179757788						
CEACAM3					-0.2765483						
CEACAM8					0.926093655						
CELA2A											-0.629137608
CELA3A											0.128135208
CEND1			0.13927402								
CFB								-0.789405418			
CFHR2								0.094221119			
CFHR4								0.071904006			
CFHR5								-0.384346205			
CFP					-0.058988787						
CLC					0.622225725						
CLEC12A					0.878573985						
CLEC2L			-0.299046463								
CLEC4D					0.184026459						
CLEC4M								0.269775884			
CLPS											-0.021909724

CNDP1			-0.0554848 43								
CNP			-0.6843023 62								
CNTF			-0.0821830 73								
CNTN1			0.99625151 8								
CNTN2			0.50256166 5								
CNTNAP2			-0.2646190 99								
CNTNAP4			0.07025442								
CORO1A					-0.0359816 99						
CPA1											0.29742752 1
CPA2											0.06048566 2
CPB1											0.17513760 8
CPB2								2.77842502 2			
CPLX2			0.01465611 4								
CPPED1					-0.3089402 55						
CR1					-0.3673159 12						
CRH			-0.1250181 6								
CRLF1		-3.4533015 2									
CRTAM			0.31169143 7								
CSF1R					-0.9666683 98						
CSF2									0.49201046 1		
CSF2RA					0.03740486 5						
CSF2RB					-0.2067272 74						
CSF3R					-0.7423948 04						
CSPG5			-0.0890854 53								
CST7					-0.1685274 69						

CTRB1											-0.7447597 53
CTRC											0.06329316 1
CTRL											-0.3375086 54
CUZD1											-0.9365464 96
CXCL1					-0.0549755 29						
CXCL13					0.30734548 7						
CXCL6					0.30006387 2						
CYP24A1							-0.0358594 95				
CYTL1		-3.3143804 86									
DCXR								0.65894736 2			
DEFA1_DEFA1B					0.42176815 3						
DHODH								0.01656639 3			
DNAJC6			-0.0093748 42								
DNM1			-0.1127304 19								
DNM3			0.2827593								
DPEP2					0.56692572						
DUSP29										0.21526330 3	
EGLN1										1.01897353 8	
ELAVL4			-0.0342296 77								
ELN		6.94633709 1									
ENO2			0.26196912 4								
ENO3										-1.8275938 23	
ENOPH1			-0.0007861 94								
ENPP6			-0.7458639 68								
EPO								-0.0983367 94			

EVI2B				0.29777113						
EXTL1			0.14180933 3							
F11							0.24776352 5			
F12							-0.1453717 88			
F13B							0.09557262 2			
F2							-2.5420464 23			
F7							-0.9790349 68			
F9							2.23397322 9			
FABP2						-0.5093238 72				
FABP4	2.81732857 2									
FABP6						0.08404467 1				
FASLG					-3.6888762 25					
FCAR					0.08882247 3					
FCGR2A					0.18889955 3					
FCGR3B					-0.7262355 99					
FCN1					0.56435170 6					
FCRL6					0.43859278 1					
FETUB							-2.2804171 36			
FGA							4.92146076 8			
FGD3					-0.1066318 77					
FGF21							0.04501234 1			
FGF3			-0.1483906 91							
FGF6									0.11697425 9	
FGL1							0.21794714 9			
FGR					-0.1220911 28					

FKBP1B			0.41242946								
FMNL1					-0.5211828 45						
FOLR3					-0.0065348 89						
FRZB		0.52893375 8									
FYB1					0.52386342 3						
GABRA4			-0.0373991 41								
GAD1			-0.0555626 79								
GAD2			0.01185090 5								
GC								-0.4772136 63			
GCG										-0.3930097 77	
GDF2								-0.7940789 44			
GFAP			3.26181809 6								
GMFG					1.27546838 1						
GNLY					0.82085078 3						
GP2										0.85864957 8	
GPA33						-0.0638825 62					
GPC5			0.06903443 3								
GPR101			-0.0051299 05								
GPR158			0.18756419 3								
GPR37			-0.2674958 48								
GRIK2			0.43790151 2								
GRIN2B			-0.0874856 21								
GUCA2A						2.91626160 2					
GUCY2C						-0.2963973 11					
GZMA					0.41900809 3						

GZMB					-0.3860006 99						
GZMH					0.28314437						
HAO1								0.08940791 9			
HAVCR1							4.39262619 5				
HBQ1					-0.6171551 93						
HCLS1					-0.4743449 57						
HGFAC								0.84833865 5			
HMOX1					0.72701576						
HRG								0.99689073 5			
HSD11B1								-1.1265590 88			
HTR1A			-0.0734542 26								
ICAM3					0.41745388 1						
IDI2										0.51854362	
IDS			-1.7098960 02								
IGFBP1								0.24887556 9			
IGLON5			-0.0588673 83								
IGSF21			-0.6446107 15								
IL17RA					-0.1456877 85						
IL18RAP					-0.2455806 79						
IL1R2					-3.3443777 23						
IL2RB					-0.1378604 18						
IL2RG					0.23812820 8						
IL9			0.04004829 3								
IMPG1			-0.1997650 83								
INHBC								0.17493777 6			

INSL5						-0.1091350 55					
ITGAM					-1.8607248 64						
ITGB1BP2				-0.0908520 86							
ITGB2					3.14562732 5						
ITGB6							-0.1552370 33				
ITGBL1		1.54639306 7									
ITIH1								0.63801348 8			
ITIH3								1.67287067 7			
ITIH4								-3.2086485 63			
KCNIP4			-0.1610819 38								
KIAA1549L			-0.0812799 58								
KIR2DL3					0.43294617 7						
KIR2DS4					0.01313353 4						
KIR3DL1					-0.0130335 69						
KIR3DL2					-0.1392238 61						
KIRREL2											-0.3803261 77
KLHL41									-1.3584687 14		
KLK1											0.43482796 1
KLKB1								-0.6268922 21			
KLRF1					1.09985506 3						
LAMP3									2.22965827		
LAT2					-0.2671647 09						
LBP								-0.2638115 1			
LCN15			0.15988339 5								
LCPI					-0.3115564						

LECT2								3.85397347 1			
LEP	-0.8016757 06										
LGALS4						1.72437517 1					
LHPP			-0.2726526 62								
LILRA2					1.47598134 3						
LILRA5					-0.7280191 09						
LILRA6					0						
LILRB1					-0.6355123 9						
LILRB2					1.22228438 2						
LPA								-0.0351425 29			
LRFN2			-0.2903282 5								
LRRC25					-0.4000135 58						
LRTM1					-0.3485486 56						
LRTM2			-0.6303758 13								
LTBP2		4.52248575 3									
LYN					-0.3881430 3						
LYPD8						0.00480694 8					
MAG			0.08905671 3								
MAP2			-0.2675936 07								
MAPK9			0.29425168 4								
MBL2								-0.0699052 54			
MCEMP1					0.04951382 3						
MDGA1			0.00287404								
MEGF10			-0.6265426 04								
MEGF11			-0.2691449 27								

MEP1A						0.28311165 6					
MEP1B						0.34963329 5					
MEPE			-2.3437237 32								
MFGE8		-0.4545541 25									
MLN						1.77918610 1					
MMP8					-0.0825061 81						
MMP9					1.23308233 8						
MNDA					-0.1798795 24						
MOG			6.46141107 7								
MPO					-0.1267862 36						
MST1								-0.1865004 16			
MUC13						-0.4971920 03					
MUC2						0.57457426 6					
MYBPC1										3.73839716 8	
MYBPC2										-0.4476098 12	
MYH4										0.01523272 1	
MYL1										-0.3543709 43	
MYL4				0.45794295 9							
MYLPF										-0.7664979 58	
MZB1					-1.5465373 66						
MZT1			-0.4709886 34								
NCAN			-1.1023935 14								
NCF2					-0.2920948 35						
NCR1					1.08592858 9						
NEB										-0.1765245 6	

NEFL			3.71486404 9								
NFE2					-0.0019270 02						
NGFR			-0.1298335 12								
NMRK2				-0.6650217 56							
NPHS2							-0.0612893 35				
NPPB				1.18080192 3							
NPTX1			0.36325576 2								
NPTXR			-0.6319130 82								
NRGN			-0.1617844 74								
NRXN3			0.18799457 1								
NXPE4						-0.3057861 69					
OMG			0.93085026 9								
ORM1								-2.0609232 2			
OSM					-1.8146219 83						
OSTN			0.40184740 9								
OXT			-0.2623194 3								
PACS2			0.15619446 6								
PADI4					0.57830710 4						
PDZK1							-1.2719635 48				
PENK			1.25696662 1								
PF4					0.5561926						
PGLYRP1					0.47718445 2						
PGLYRP2								-0.0994613 13			
PILRA					1.25932962 8						
PLA2G1B											-1.3448763 45

PLG								-3.1075947 64			
PLIN1	0.96317315 5										
PMCH			-0.1032637 7								
PNLIP											0.29469019 7
PNLIPRP1											-0.0635121 17
PNLIPRP2											-0.0095633 81
PNMA2			0.09112579 9								
POLR2F			-0.1730055 51								
PON1								-0.9287858 59			
PON3								-1.0254298 76			
PPBP					0.03116867 8						
PPP1R14D						-0.5030578 59					
PPP3R1			0.43423193 5								
PPY											1.15011594 5
PRG2					1.78734305						
PRG3					-1.7864926 22						
PRKAG3										0.63126207 6	
PROC								1.41753508 4			
PRSS2											1.86471597 2
PRTN3					-1.2684583 19						
PSTPIP2					1.01799470 1						
PTH1R							0.71912644 6				
PTPRC					1.03102674 2						
PTPRR			-6.0376185 78								
PTPRZ1			4.09194072 3								

PVALB			0.05110446 4							
PXDNL				0.09036621 2						
PYY						0.06553816 1				
PZP							-0.2902516 86			
QDPR			-1.1388428 77							
RAB6B			-0.1675082 52							
RASGRF1			0.06053421 8							
RBP2						-0.3461521 57				
REG1A										1.37285869 3
REG1B										0.39869862 3
REG3G										-0.5075119 01
REG4						1.34256432 2				
REN							0.56134765 1			
RETN					-0.0074832 12					
RGS8			-0.0897765 54							
RNASE3					0.10031278 9					
RNF149					1.59353339 9					
RTN4R			0.19588047 5							
RYR1									0.17466105	
S100A12					0.47958921 1					
S100G						0.61852085 9				
SAA4							-1.2076976 97			
SCGB1A1								2.36274270 1		
SCGB3A2								0.21715067 3		
SCN2A			0.01887151 5							

SCN2B			0.20787596 8								
SCN4B			0.21983894 5								
SCRN1			0.36356706 3								
SEL1L											1.65778489 5
SELL						-4.2843702 64					
SELPLG						1.16821790 7					
SEPTIN3			0.52136208 3								
SEPTIN8			2.94513222 4								
SERPINA1									1.60560771 1		
SERPINA11									0.79566336 4		
SERPINA6									-0.3382267 88		
SERPINA7									-0.7590511 43		
SERPINC1									-4.9375746 11		
SERPIND1									-1.2643519 81		
SERPINF2									-5.1473849 35		
SERPINI1			-0.6065793 38								
SERPINI2											-1.6973818 11
SEZ6			0.10760091 1								
SEZ6L			-0.4423196 98								
SFTPA1									0.09992194 1		
SFTPA2									0.22622347 8		
SFTPD									1.06849784 8		
SIGLEC5						-0.0363253 45					
SIGLEC7						3.26442827 9					
SIGLEC9						0.01333263 5					

SIRPB1					-0.0742963 25						
SLA2					-0.9268207 98						
SLC51B						0.13521239 1					
SLITRK1			0.21002551 7								
SNAP25			-0.8245739 03								
SOD2										-0.9636935 44	
SOST		1.63999770 9									
SOWAHA			0.01264971 2								
SPINK1											1.80275866 7
SPINK4						0.32483972 6					
SPOCK1			2.79627107 6								
STAB2					-0.2804750 16						
STX1B			0.10146173 2								
SUSD5		2.39340095 6									
SV2A			-0.3210310 65								
SYT1			0.26353086								
TAGLN3			-0.0338389 92								
TARM1					-0.0839205 64						
TBR1			-0.0225765 93								
TDO2									-0.4034113 19		
THBS2		-3.4316091 91									
TLR1					0.10321357 9						
TMOD4										-0.1407049 26	
TMPRSS15						-0.1388889 54					
TMPRSS5			0.35421719 9								

TNFAIP8L2					-0.2907680 42						
TNFRSF10C					0.26335146 7						
TNFRSF11B		3.54658239 6									
TNFRSF1B					0.44040574 3						
TNNI3				0.31916520 7							
TNR			-0.5132100 81								
TPM3										-0.6299310 76	
TREML1					0.18216608 8						
TREML2					-2.4062901 76						
TSPAN7			-0.0483247 32								
TTN										-0.1514624 06	
TTR								2.11379320 1			
TUBB3			0.10042291 9								
UMOD							-0.3842553 68				
UPB1								-0.4216532 37			
VCAN		-0.3073284 21									
VIPR1										-0.7904915 09	
VNN2					0.2962494						
VSIR					-0.4033767 78						
VSNL1			-0.0218281 93								
VSTM1					-0.3919050 55						
VSTM2B			-0.1267747 82								
VWC2L			0.14775791								
WAS					-0.0238525 04						

Table S3. Coefficients and Intercepts of the 11 Organ-Specific Biological Aging Models Trained with Elastic Net Regression to Predict Time-to-death

Proteins	Adipose	Artery	Brain	Heart	Immune	Intestine	Kidney	Liver	Lung	Muscle	Pancreas
A1BG								0.073879606			
ACAN		-0.69260990 1									
ADCYAP1R 1			-0.00684816 7								
ADGRE1					-0.13841636 4						
ADGRE2					0.310539841						
ADIPOQ	0.024632613										
AFM								0.32178208			
AGER									-0.24139625 8		
AGT								-0.07689055 3			
AHSG								-0.10014544 1			
AHSP					0.005449748						
AIF1					0.067403147						
AKR1C4								0.008518656			
ALPI						-0.08625778 5					
ALPP									0.03758002		
AMBP								0.508844357			
AMY2A											-0.07117318 6
ANG								0.116528476			
ANGPTL3								-0.02396791 6			
ANGPTL7			0.06867338								
APCS								0.006715577			
APLP1			-0.07280312 5								
APOA2								0.136378702			
APOA4						-0.21683109 8					

APOC1								-0.03923315 6			
APOD			0.01842278								
APOF								-0.03028526 7			
ARHGAP30					-0.00770949 4						
ASGR1								0.396013731			
ASGR2								0.107066668			
ATP6V1G2			-0.01239816 6								
AZU1					-0.01293149						
BCAN			-0.60248638								
BGN		-0.12037207 5									
BIN2					-0.03260444 9						
BMP10				-0.04833252 7							
BST1					0.019724952						
C1QL2			-0.1198829								
C4BPB								-0.06155714 8			
C8B								-0.01646929			
C9								0.097343375			
CA11			-0.01047521 6								
CA14			-0.35534793 8								
CA3										0.059896128	
CA7						-0.04334171 3					
CCL16								0.176014225			
CCL18									0.205276035		
CCL25						0.115424252					
CCL5					0.018789522						
CD177					-0.01644524 9						

CD300A					0.129169981						
CD300LG	-0.0830153										
CD5L					0.018398827						
CD7					-0.01845897 5						
CD72					0.068578271						
CD8A					-0.12206090 2						
CDH17						-0.07166713 8					
CDHR2						0.256808167					
CDHR5						-0.2061074					
CEACAM18						0.000299113					
CEACAM20						0.15301665					
CEACAM21					0.000718692						
CEACAM8					0.146873607						
CELA2A											-0.13727029 5
CELA3A											-0.00704241 3
CEND1			0.029096772								
CFB								-0.11820123 7			
CFHR4								0.038118707			
CFHR5								0.048502143			
CFP					-0.49506031 4						
CLC					0.030551937						
CLEC12A					0.039560728						
CLEC4D					0.022308853						
CLEC4M								-0.08045041 2			
CLPS											0.027354395
CNDP1			-0.23926787 5								
CNP			-0.13702805 5								

CNTN1			-0.15323640 5								
CNTN2			0.054237752								
CNTNAP2			0.211910871								
CNTNAP4			0.051761884								
CORO1A					0.035351492						
CPA2											-0.14878904 3
CPB1											0.14811205
CPB2							0.115667785				
CRH			-0.10703404 9								
CRLF1		0.004320229									
CRTAM			0.10501542								
CSF1R					0.121765362						
CSF2RA					0.043434532						
CSF3R					-0.11156976 7						
CST7					0.008844247						
CTRB1											-0.19950997 7
CTRC											-0.10259369 5
CTRL											0.154855475
CUZD1											-0.05285381 1
CXCL1					-0.00035851 5						
CXCL13					0.166924074						
CXCL6					0.038865229						
CYP24A1							0.021784212				
CYTL1		0.327537988									
DCXR								-0.03544872 3			
DHODH								-0.00991968 9			
DNM1			-0.04498561 5								

DNM3			-0.00276962								
DUSP29										0.006651253	
EGLN1										0.28771434	
ELN		0.573924244									
ENO3										-0.48769870 2	
ENPP6			-0.22130100 9								
EPO								0.092931334			
EXTL1			-0.04328481 1								
F11								-0.16914714 9			
F12								-0.00140108 1			
F13B								-0.26868901 6			
F7								-0.37348322 3			
F9								0.239460105			
FABP2						-0.23248255 9					
FABP4	0.710260525										
FABP6						-0.11929055 8					
FASLG					-0.50962504 9						
FCGR2A					0.03702994						
FCGR3B					-0.08490202 4						
FCN1					0.014060195						
FETUB								-0.07487558 4			
FGA								0.427516362			
FGF21								0.097412567			
FGL1								0.168331889			
FMNL1					-0.02336032 7						
FOLR3					-0.00268809 9						

GC								-0.01554173 6			
GCG											-0.04658969 8
GDF2								-0.14512082			
GFAP			0.32490273								
GP2											0.195276679
GPA33							-0.05549320 8				
GPC5			-0.12839000 6								
GPR101			-0.01369163 1								
GPR158			-0.00503734 2								
GPR37			0.156621697								
GRIN2B			-0.06285616 8								
GUCA2A							0.30760712				
GUCY2C							-0.00304588 5				
GZMA						-0.01626084					
GZMB						-0.06468728 3					
GZMH						0.077404105					
HAO1								0.042411976			
HAVCR1							0.546894128				
HBQ1						-0.03711040 5					
HCLS1						0.029858788					
HGFAC								-0.03968748 5			
HRG								-0.00630641 1			
HSD11B1								-0.01464515 6			
ICAM3						0.169094915					
IDI2										0.116962152	
IGFBP1								0.05183362			

IGSF21			-0.14529292 3								
IL18RAP					-0.03152182 9						
IL1R2					-0.08041694 9						
IL2RG					0.027277519						
IL9			-0.00919568 5								
INHBC								0.003949161			
INSL5						0.060824684					
ITGAM					-0.52100019 4						
ITGB1BP2				0.064868048							
ITGBL1		0.208153291									
ITIH3								0.313888206			
KCNIP4			-0.02050695 8								
KIAA1549L			0.058401036								
KIR2DL3					0.082965925						
KIR2DS4					0.009649537						
KIRREL2											-0.05656510 7
KLHL41									-0.11209225 2		
KLK1											0.060223576
KLKB1								-0.32886226			
KLRF1					0.050569298						
LAMP3									0.525558039		
LBP								-0.01222386 1			
LCN15			0.116727903								
LCP1					-0.05688358 5						
LECT2								0.28736155			
LEP	-0.24329623 4										
LGALS4						0.399389071					

LHPP			-0.01061867 3								
LILRA5					0.004949459						
LILRA6					0.014758811						
LILRB2					0.113270181						
LPA							0.001152951				
LRRC25					0.02018868						
LRTM1					-0.01686490 5						
LRTM2			-0.07919887 7								
LTBP2		0.906383599									
LYPD8						0.065232502					
MAP2			0.050049548								
MBL2							0.045178576				
MCEMP1					0.029204744						
MDGA1			-0.00775883 1								
MEGF11			0.035386841								
MEP1A						0.110078419					
MEP1B						-0.09108776 1					
MEPE			-0.29279872 3								
MFGE8		0.05078519									
MLN						0.124565309					
MMP8					0.016745648						
MMP9					0.228443944						
MOG			0.276239759								
MPO					0.023401177						
MST1							0.005134011				
MUC13						0.007708047					
MUC2						-0.00036340 9					

MYBPC1										0.439020608	
MYBPC2										0.071009393	
MYL1										0.015964244	
MYL4				0.300749446							
MYLPF										0.128153425	
MZB1					0.189456754						
MZT1			-0.06243047 2								
NCAN			-0.20354871 9								
NCF2					-0.01265414 9						
NEFL			0.675478144								
NMRK2				-0.11457539 7							
NPPB				0.295530823							
NPTX1			0.126268803								
NRGN			0.064550645								
NXPE4						-0.04728910 9					
OMG			-0.05518947 2								
ORM1								0.011319408			
OSM					-0.06594509						
OSTN			0.000393244								
OXT			-0.00328218 2								
PACS2			-0.01321378 6								
PADI4					0.010002468						
PENK			0.140891756								
PF4					0.04231255						
PGLYRP1					0.010678295						
PGLYRP2								0.028873244			
PILRA					0.155164703						

PLA2G1B											-0.52736716 7
PLG								-0.06270592 3			
PLIN1	-0.07931385										
PNLIP											-0.14023856 4
PNLIPRP1											-0.01551627 9
PNLIPRP2											0.001219381
PNMA2			0.019498435								
POLR2F			0.121226749								
PON1								-0.19916525 5			
PON3								-0.18475858 5			
PPP1R14D						-0.02255992 7					
PPP3R1			0.0032334								
PPY											0.119445562
PRG2					0.481380883						
PRG3					-0.35082215 9						
PROC								-0.19481823			
PRSS2											0.51670602
PRTN3					-0.01849294 1						
PSTPIP2					0.025945931						
PTPRC					0.014486511						
PTPRR			-0.27538190 5								
PTPRZ1			0.45790948								
PVALB			0.018853535								
PXDNL				-0.01509694 6							
PYY						0.029067885					
PZP								-0.17778804 2			

QDPR			-0.04057052 8								
RBP2						0.151311385					
REG1A											0.188524776
REG1B											0.096548071
REG3G											0.025495526
REG4						0.332237929					
REN							0.301590098				
RETN					-0.07847292 7						
RGS8			-0.02018842 2								
RNASE3					-0.04254754 7						
RNF149					0.349270432						
RTN4R			0.030458275								
S100A12					0.04513054						
S100G						0.100890039					
SCGB1A1								0.066783356			
SCGB3A2								0.029416414			
SCN2B			0.005480288								
SCRN1			-0.0178676								
SEL1L											0.39949415
SELL					-0.59403912 9						
SELPLG					-0.15934236 6						
SEPTIN3			0.089762756								
SEPTIN8			0.545705911								
SERPINA1								0.724361933			
SERPINA11								0.178286263			
SERPINA6								-0.02773770 2			
SERPIND1								0.135279181			

SERPINF2								-1.27143227 3			
SERPINI2											-0.20914930 9
SEZ6			0.049972784								
SEZ6L			0.004168447								
SFTPA1									0.05990847		
SFTPA2									0.0500262		
SFTPD									0.189882216		
SIGLEC5					0.024464859						
SIGLEC7					0.590742129						
SIRPB1					-0.01375983 3						
SLA2					-0.05397914 8						
SLITRK1			-0.26819901 2								
SNAP25			0.004758307								
SOD2										0.20491951	
SPINK1											0.641740734
SPINK4						0.14199484					
SPOCK1			0.414713052								
SUSD5		0.166525047									
SYT1			0.028084169								
THBS2		0.020457588									
TLR1					0.097647533						
TMPRSS15						-0.04423103 3					
TMPRSS5			0.02806204								
TNFAIP8L2					-0.07271985 5						
TNFRSF10C					0.062938695						
TNFRSF11B		0.525747787									
TNFRSF1B					0.218515211						

TNNI3				0.096380365							
TNR			-0.30505586								
TREML2					-0.46478014 2						
TSPAN7			-0.02101369 8								
UMOD							-0.23875864 5				
UPB1								-0.06899498 3			
VSNL1			0.093208961								
VSTM2B			-0.03094530 7								
VWC2L			-0.04578492 5								

Table S4. Baseline Characteristics Stratified by Baseline Diabetes Complication Status

	Overall	No Complication	Baseline diabetes complications			
			CVD	DR	PAD	CKD
Sample size	1945	1707	187	59	35	34
Age, years	59.68 (7.29)	59.43 (7.40)	62.00 (5.97)	61.24 (6.41)	62.14 (5.65)	62.41 (6.02)
Sex (%)	1181 (60.72%)	1011 (59.23%)	138 (73.80%)	39 (66.10%)	20 (57.14%)	19 (55.88%)
White (%)	1662 (85.45%)	1447 (84.77%)	172 (91.98%)	50 (84.75%)	33 (94.29%)	31 (91.18%)
College (%)	427 (22.49%)	386 (23.18%)	29 (15.85%)	12 (20.34%)	5 (14.71%)	6 (17.65%)
TDI (SD)	-0.15 (3.54)	-0.89 [-3.06;2.51]	-0.88 [-3.22;2.54]	-0.72 [-2.27;2.81]	-0.47 [-1.95;3.12]	-0.90 [-2.48;1.97]
Current smoker (%)	239 (12.29%)	211 (12.36%)	20 (10.70%)	4 (6.78%)	8 (22.86%)	1 (2.94%)
BMI, kg/m ²	31.64 (5.98)	31.60 (5.97)	32.35 (5.86)	31.34 (6.44)	32.26 (7.05)	33.46 (6.57)
SBP, mmHg	141.40 (17.52)	141.99 (17.34)	135.34 (17.62)	143.32 (17.83)	141.07 (19.36)	138.04 (15.76)
Glycated haemoglobin, %	7.37 (1.32)	7.39 (1.31)	7.13 (1.44)	7.91 (1.42)	6.93 (1.25)	6.94 (1.35)
Total cholesterol, mmol/L	4.64 (1.20)	4.71 (1.21)	4.11 (1.07)	4.04 (1.02)	4.35 (0.97)	3.99 (0.78)
HDL-cholesterol, mmol/L	1.19 (0.33)	1.20 (0.32)	1.08 (0.32)	1.15 (0.41)	1.15 (0.29)	1.08 (0.33)
Glucose, mmol/L	8.06 (3.62)	8.10 (3.60)	7.60 (3.37)	8.37 (4.28)	7.88 (4.35)	7.32 (2.82)
Antidiabetes drug	1280 (65.81%)	1119 (65.55%)	120 (64.17%)	55 (93.22%)	23 (65.71%)	27 (79.41%)
Antihypertensive drug	1289 (66.27%)	1069 (62.62%)	176 (94.12%)	54 (91.53%)	33 (94.29%)	34 (100.00%)

BMI: body mass index; CKD: chronic kidney disease; CVD: cardiovascular disease; DR: diabetic retinopathy; HDL: high-density lipoprotein; HR: hazard ratio; PAD: peripheral artery disease; SBP: systolic blood pressure; TDI: Townsend deprivation index.

Table S5. Performance of Organ-Specific Aging Models: Correlation Coefficients (r) and Mean Absolute Errors (MAE) in the Original Test Cohort and Current Diabetes Cohort

Organ	Original Study (Test Cohort)		Current Study (Diabetes Cohort)	
	r	MAE	r	MAE
Brain	0.710	4.724	0.583	4.784
Artery	0.710	4.795	0.577	5.329
Liver	0.610	5.360	0.519	5.209
Immune	0.539	5.749	0.429	5.303
Intestine	0.460	6.106	0.372	5.511
Lung	0.346	6.511	0.292	6.128
Heart	0.327	6.573	0.335	6.131
Pancreas	0.321	6.576	0.343	5.693
Muscle	0.302	6.640	0.267	6.217
Adipose	0.248	6.789	0.178	6.421
Kidney	0.135	6.960	0.179	6.142

MAE: mean absolute errors.

Table S6. Pairwise Associations of Extreme Aging Across 11 Organs

	Brain	Artery	Liver	Immune	Intestine	Lung	Heart	Pancreas	Muscle	Adipose	Kidney
Brain	1.000	0.281	0.198	0.182	0.198	0.166	0.225	0.172	0.142	0.163	0.139
Artery	0.281	1.000	0.331	0.205	0.230	0.222	0.335	0.248	0.175	0.257	0.149
Liver	0.198	0.331	1.000	0.248	0.237	0.202	0.259	0.213	0.112	0.237	0.190
Immune	0.182	0.205	0.248	1.000	0.186	0.194	0.115	0.173	0.109	0.157	0.162
Intestine	0.198	0.230	0.237	0.186	1.000	0.191	0.144	0.346	0.112	0.176	0.227
Lung	0.166	0.222	0.202	0.194	0.191	1.000	0.114	0.183	0.080	0.164	0.129
Heart	0.225	0.335	0.259	0.115	0.144	0.114	1.000	0.205	0.086	0.206	0.141
Pancreas	0.172	0.248	0.213	0.173	0.346	0.183	0.205	1.000	0.117	0.211	0.241
Muscle	0.142	0.175	0.112	0.109	0.112	0.080	0.086	0.117	1.000	0.111	0.092
Adipose	0.163	0.257	0.237	0.157	0.176	0.164	0.206	0.211	0.111	1.000	0.145
Kidney	0.139	0.149	0.190	0.162	0.227	0.129	0.141	0.241	0.092	0.145	1.000

Phi coefficients were used to evaluate associations.

Table S7. Organ-Specific Age Gaps and Incident Diabetes Complications

Endpoint	Organ	Adjusted HR per 1-SD increment (95%CI)	<i>P</i>
CVD	Brain	1.17 (1.04, 1.31)	0.008
	Artery	1.03 (0.91, 1.17)	0.612
	Liver	0.93 (0.82, 1.05)	0.214
	Immune	0.90 (0.79, 1.02)	0.101
	Intestine	1.10 (0.98, 1.25)	0.119
	Lung	1.02 (0.91, 1.15)	0.698
	Heart	1.47 (1.32, 1.64)	<0.001
	Pancreas	1.12 (1.00, 1.25)	0.044
	Muscle	0.98 (0.88, 1.09)	0.745
	Adipose	0.96 (0.86, 1.06)	0.408
	Kidney	1.07 (0.97, 1.18)	0.182
DR	Brain	1.25 (1.09, 1.44)	0.001
	Artery	1.19 (1.02, 1.39)	0.024
	Liver	0.92 (0.78, 1.08)	0.306
	Immune	0.99 (0.85, 1.16)	0.899
	Intestine	0.94 (0.81, 1.10)	0.47
	Lung	0.94 (0.82, 1.08)	0.411
	Heart	1.03 (0.90, 1.19)	0.661
	Pancreas	1.11 (0.97, 1.27)	0.12
	Muscle	1.15 (1.02, 1.31)	0.028
	Adipose	1.02 (0.90, 1.17)	0.737
	Kidney	1.07 (0.94, 1.21)	0.304
PAD	Brain	1.34 (1.07, 1.67)	0.011
	Artery	1.03 (0.81, 1.30)	0.836
	Liver	0.98 (0.76, 1.26)	0.878
	Immune	0.90 (0.70, 1.16)	0.4
	Intestine	0.91 (0.71, 1.16)	0.448
	Lung	1.14 (0.90, 1.43)	0.27
	Heart	1.59 (1.28, 1.97)	<0.001
	Pancreas	0.97 (0.78, 1.22)	0.802
	Muscle	0.97 (0.79, 1.20)	0.802
	Adipose	0.85 (0.69, 1.04)	0.118
	Kidney	1.34 (1.10, 1.63)	0.004
CKD	Brain	0.96 (0.84, 1.09)	0.521

Death	Artery	1.21 (1.06, 1.38)	0.005
	Liver	1.05 (0.92, 1.20)	0.467
	Immune	1.06 (0.91, 1.23)	0.459
	Intestine	1.08 (0.93, 1.24)	0.317
	Lung	1.19 (1.03, 1.36)	0.014
	Heart	1.28 (1.13, 1.44)	<0.001
	Pancreas	1.32 (1.17, 1.49)	<0.001
	Muscle	1.17 (1.04, 1.32)	0.007
	Adipose	1.04 (0.93, 1.17)	0.485
	Kidney	1.18 (1.05, 1.31)	0.004
	Brain	1.30 (1.17, 1.45)	<0.001
	Artery	1.15 (1.02, 1.29)	0.024
	Liver	0.95 (0.84, 1.07)	0.386
	Immune	0.84 (0.74, 0.95)	0.007
	Intestine	1.04 (0.92, 1.18)	0.496
	Lung	1.19 (1.06, 1.34)	0.002
	Heart	1.16 (1.04, 1.28)	0.007
	Pancreas	1.05 (0.95, 1.18)	0.344
	Muscle	0.92 (0.82, 1.02)	0.104
	Adipose	0.95 (0.86, 1.06)	0.36
	Kidney	1.06 (0.96, 1.17)	0.285

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, glucose levels, and concurrent organ aging gaps.

CI: confidence interval; CKD: chronic kidney disease; CVD: cardiovascular disease; DR: diabetic retinopathy;

HR: hazard ratio; PAD: peripheral artery disease; SD: standard deviation.

Table S8. The Variance Inflation Factor of Cox Regression Model

Covariate	Variance inflation factor
Age	1.27065767229635
Sex	1.45706299524641
White	1.19454688212544
Townsend deprivation index	1.14925095384467
Current smoker	1.08759837655607
Antihypertensive drug	1.40545305704911
Antidiabetes drug	1.42758529255163
Systolic blood pressure	1.14971889019036
Body mass index	1.40861894011294
Total cholesterol	1.46209427675703
Glucose	1.16171914550372
Brain age gap	1.24766497336559
Artery age gap	1.65630577635234
Liver age gap	1.44861280073119
Immune age gap	1.40292746357846
Intestine age gap	1.50161419715781
Lung age gap	1.26445593029967
Heart age gap	1.28203959210213
Pancreas age gap	1.58044206908779
Muscle age gap	1.11997024890547
Adipose age gap	1.71964861489939
Kidney age gap	1.52078895109464

Table S9. Extreme Organ Aging and Diabetes Complication Risks

Endpoint	Organ	Adjusted HR (95%CI)	<i>P</i>
CVD	Brain	1.43 (1.06, 1.92)	0.019
	Artery	1.59 (1.06, 2.39)	0.024
	Liver	0.66 (0.44, 0.98)	0.042
	Immune	0.92 (0.68, 1.23)	0.56
	Intestine	1.20 (0.92, 1.57)	0.181
	Lung	1.07 (0.72, 1.59)	0.734
	Heart	2.92 (2.13, 3.99)	<0.001
	Pancreas	1.35 (1.04, 1.77)	0.027
	Muscle	0.86 (0.60, 1.24)	0.427
	Adipose	0.90 (0.64, 1.26)	0.527
	Kidney	1.08 (0.83, 1.41)	0.549
DR	Brain	1.83 (1.29, 2.58)	<0.001
	Artery	2.20 (1.36, 3.57)	0.001
	Liver	0.92 (0.55, 1.52)	0.738
	Immune	0.75 (0.51, 1.10)	0.145
	Intestine	0.88 (0.61, 1.25)	0.475
	Lung	0.56 (0.29, 1.08)	0.084
	Heart	1.66 (1.05, 2.63)	0.03
	Pancreas	1.47 (1.05, 2.05)	0.024
	Muscle	1.67 (1.15, 2.42)	0.007
	Adipose	1.00 (0.65, 1.53)	0.996
	Kidney	1.26 (0.91, 1.75)	0.162
PAD	Brain	1.69 (0.98, 2.92)	0.062
	Artery	2.34 (1.13, 4.85)	0.022
	Liver	1.06 (0.51, 2.23)	0.873
	Immune	0.86 (0.48, 1.53)	0.597
	Intestine	0.70 (0.40, 1.25)	0.228
	Lung	1.52 (0.74, 3.11)	0.255
	Heart	2.49 (1.29, 4.80)	0.007
	Pancreas	1.11 (0.65, 1.88)	0.703
	Muscle	0.96 (0.50, 1.84)	0.895
	Adipose	0.83 (0.42, 1.64)	0.587
	Kidney	1.41 (0.84, 2.36)	0.191
	Brain	0.95 (0.68, 1.34)	0.774

CKD	Artery	1.70 (1.14, 2.52)	0.009
	Liver	1.09 (0.75, 1.59)	0.664
	Immune	1.26 (0.93, 1.71)	0.14
	Intestine	1.44 (1.08, 1.93)	0.013
	Lung	1.65 (1.12, 2.43)	0.012
	Heart	2.31 (1.63, 3.28)	<0.001
	Pancreas	2.08 (1.55, 2.77)	<0.001
	Muscle	1.83 (1.32, 2.54)	<0.001
	Adipose	1.43 (1.01, 2.00)	0.041
	Kidney	1.39 (1.04, 1.87)	0.027
	Brain	1.65 (1.25, 2.18)	<0.001
Death	Artery	1.39 (0.93, 2.07)	0.111
	Liver	1.06 (0.74, 1.51)	0.754
	Immune	0.86 (0.64, 1.15)	0.307
	Intestine	1.08 (0.82, 1.41)	0.586
	Lung	1.62 (1.16, 2.27)	0.005
	Heart	1.74 (1.24, 2.43)	0.001
	Pancreas	1.34 (1.03, 1.75)	0.029
	Muscle	1.21 (0.89, 1.66)	0.228
	Adipose	0.76 (0.54, 1.07)	0.112
	Kidney	1.18 (0.91, 1.53)	0.211

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, glucose levels, and concurrent extreme organ aging.

CI: confidence interval; CKD: chronic kidney disease; CVD: cardiovascular disease; DR: diabetic retinopathy;

HR: hazard ratio; PAD: peripheral artery disease.

Table S10. Association between Risk of Diabetes Complication and Organ-specific Age Gaps Calculated by Three Different Models

Endpoints	Organ	LASSO HR	LASSO <i>P</i>	EN HR	EN <i>P</i>	Mortality HR	Mortality <i>P</i>
CKD	Adipose	1.04 (0.93-1.17)	0.485	1.24 (1.07-1.45)	0.005	1.28 (1.11-1.48)	<0.001
CKD	Artery	1.21 (1.06-1.38)	0.005	1.25 (1.08-1.45)	0.003	1.15 (0.96-1.38)	0.136
CKD	Brain	0.96 (0.84-1.09)	0.521	0.91 (0.78-1.05)	0.198	0.87 (0.72-1.06)	0.156
CKD	Heart	1.28 (1.13-1.44)	<0.001	0.93 (0.80-1.07)	0.317	1.03 (0.89-1.19)	0.698
CKD	Immune	1.06 (0.91-1.23)	0.459	1.00 (0.86-1.17)	0.965	1.04 (0.86-1.25)	0.702
CKD	Intestine	1.08 (0.93-1.24)	0.317	1.18 (1.01-1.37)	0.034	1.06 (0.89-1.26)	0.527
CKD	Kidney	1.18 (1.05-1.31)	0.004	1.57 (1.37-1.80)	<0.001	1.68 (1.41-1.99)	<0.001
CKD	Liver	1.05 (0.92-1.20)	0.467	1.01 (0.88-1.17)	0.881	1.15 (0.95-1.39)	0.141
CKD	Lung	1.19 (1.03-1.36)	0.014	1.17 (1.01-1.35)	0.032	1.04 (0.90-1.20)	0.612
CKD	Muscle	1.17 (1.04-1.32)	0.007	1.13 (0.99-1.29)	0.070	1.21 (1.06-1.39)	0.007
CKD	Pancreas	1.32 (1.17-1.49)	<0.001	1.34 (1.14-1.57)	<0.001	1.32 (1.12-1.56)	0.001
CVD	Adipose	0.96 (0.86-1.06)	0.408	1.01 (0.87-1.16)	0.903	1.03 (0.90-1.18)	0.688
CVD	Artery	1.03 (0.91-1.17)	0.612	1.09 (0.96-1.25)	0.191	1.18 (1.00-1.39)	0.047
CVD	Brain	1.17 (1.04-1.31)	0.008	1.12 (0.99-1.28)	0.075	1.25 (1.06-1.49)	0.009
CVD	Heart	1.47 (1.32-1.64)	<0.001	1.12 (0.98-1.29)	0.094	1.29 (1.14-1.46)	<0.001
CVD	Immune	0.90 (0.79-1.02)	0.101	0.87 (0.76-1.00)	0.049	1.03 (0.87-1.22)	0.739
CVD	Intestine	1.10 (0.98-1.25)	0.119	1.06 (0.93-1.22)	0.356	1.06 (0.90-1.24)	0.478
CVD	Kidney	1.07 (0.97-1.18)	0.182	1.18 (1.04-1.35)	0.012	1.09 (0.93-1.28)	0.277
CVD	Liver	0.93 (0.82-1.05)	0.214	0.99 (0.87-1.12)	0.845	1.14 (0.96-1.34)	0.126
CVD	Lung	1.02 (0.91-1.15)	0.698	1.07 (0.95-1.21)	0.253	1.01 (0.88-1.15)	0.934
CVD	Muscle	0.98 (0.88-1.09)	0.745	1.02 (0.91-1.14)	0.770	0.91 (0.80-1.03)	0.133
CVD	Pancreas	1.12 (1.00-1.25)	0.044	1.22 (1.06-1.40)	0.006	1.14 (0.98-1.33)	0.079
DR	Adipose	1.02 (0.90-1.17)	0.737	0.97 (0.81-1.17)	0.780	0.97 (0.82-1.16)	0.763
DR	Artery	1.19 (1.02-1.39)	0.024	1.18 (1.00-1.39)	0.056	0.98 (0.79-1.21)	0.850
DR	Brain	1.25 (1.09-1.44)	0.001	1.24 (1.06-1.46)	0.009	1.33 (1.08-1.64)	0.007
DR	Heart	1.03 (0.90-1.19)	0.661	1.04 (0.89-1.23)	0.593	1.10 (0.94-1.30)	0.228
DR	Immune	0.99 (0.85-1.16)	0.899	1.01 (0.86-1.19)	0.917	0.93 (0.76-1.15)	0.513
DR	Intestine	0.94 (0.81-1.10)	0.470	1.01 (0.86-1.19)	0.887	0.90 (0.74-1.09)	0.269
DR	Kidney	1.07 (0.94-1.21)	0.304	1.23 (1.05-1.44)	0.010	1.23 (1.02-1.49)	0.030
DR	Liver	0.92 (0.78-1.08)	0.306	0.92 (0.79-1.07)	0.273	0.92 (0.75-1.13)	0.430
DR	Lung	0.94 (0.82-1.08)	0.411	0.97 (0.84-1.12)	0.656	0.95 (0.80-1.12)	0.527
DR	Muscle	1.15 (1.02-1.31)	0.028	1.30 (1.12-1.50)	<0.001	1.10 (0.94-1.29)	0.223
DR	Pancreas	1.11 (0.97-1.27)	0.120	1.15 (0.97-1.38)	0.110	1.40 (1.16-1.70)	<0.001

Mortality	Adipose	0.95 (0.86-1.06)	0.360	0.96 (0.84-1.10)	0.587	0.93 (0.82-1.07)	0.311
Mortality	Artery	1.15 (1.02-1.29)	0.024	1.18 (1.04-1.35)	0.012	1.39 (1.18-1.63)	<0.001
Mortality	Brain	1.30 (1.17-1.45)	<0.001	1.39 (1.22-1.57)	<0.001	1.50 (1.26-1.77)	<0.001
Mortality	Heart	1.16 (1.04-1.28)	0.007	1.02 (0.90-1.16)	0.757	1.13 (1.00-1.27)	0.045
Mortality	Immune	0.84 (0.74-0.95)	0.007	0.84 (0.74-0.96)	0.012	0.91 (0.77-1.07)	0.243
Mortality	Intestine	1.04 (0.92-1.18)	0.496	1.09 (0.95-1.24)	0.220	1.15 (0.98-1.35)	0.079
Mortality	Kidney	1.06 (0.96-1.17)	0.285	1.06 (0.93-1.21)	0.403	0.92 (0.78-1.08)	0.284
Mortality	Liver	0.95 (0.84-1.07)	0.386	0.93 (0.83-1.06)	0.288	1.02 (0.87-1.20)	0.782
Mortality	Lung	1.19 (1.06-1.34)	0.002	1.28 (1.13-1.44)	<0.001	1.41 (1.25-1.59)	<0.001
Mortality	Muscle	0.92 (0.82-1.02)	0.104	0.92 (0.82-1.03)	0.131	0.93 (0.82-1.06)	0.291
Mortality	Pancreas	1.05 (0.95-1.18)	0.344	1.13 (0.98-1.30)	0.092	1.09 (0.94-1.26)	0.236
PAD	Adipose	0.85 (0.69-1.04)	0.118	0.98 (0.74-1.29)	0.864	1.11 (0.85-1.45)	0.447
PAD	Artery	1.03 (0.81-1.30)	0.836	1.12 (0.86-1.47)	0.404	1.19 (0.87-1.63)	0.270
PAD	Brain	1.34 (1.07-1.67)	0.011	1.28 (0.99-1.65)	0.058	1.92 (1.36-2.69)	<0.001
PAD	Heart	1.59 (1.28-1.97)	<0.001	1.02 (0.79-1.30)	0.893	0.99 (0.78-1.26)	0.941
PAD	Immune	0.90 (0.70-1.16)	0.400	1.05 (0.80-1.37)	0.740	1.12 (0.80-1.57)	0.507
PAD	Intestine	0.91 (0.71-1.16)	0.448	0.87 (0.66-1.14)	0.307	0.64 (0.47-0.87)	0.004
PAD	Kidney	1.34 (1.10-1.63)	0.004	1.14 (0.88-1.48)	0.317	1.12 (0.82-1.55)	0.472
PAD	Liver	0.98 (0.76-1.26)	0.878	0.92 (0.72-1.18)	0.520	1.52 (1.10-2.11)	0.012
PAD	Lung	1.14 (0.90-1.43)	0.270	1.19 (0.94-1.51)	0.155	1.25 (0.97-1.60)	0.079
PAD	Muscle	0.97 (0.79-1.20)	0.802	1.12 (0.89-1.41)	0.334	0.90 (0.69-1.16)	0.410
PAD	Pancreas	0.97 (0.78-1.22)	0.802	1.11 (0.84-1.48)	0.457	1.00 (0.74-1.34)	0.978

HRs (per 1-SD increment) have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, glucose levels, and concurrent organ aging gaps. CI: confidence interval; CKD: chronic kidney disease; CVD: cardiovascular disease; DR: diabetic retinopathy; EN: elastic net; HR: hazard ratio; PAD: peripheral artery disease; SD: standard deviation.

Table S11. Associations between Organ-specific Age Gaps and Risk of Complications in patients with or without Baseline Diabetes

Outcome	Organ	Diabetes		No Diabetes		<i>P</i> for interaction
		HR (95%CI)	<i>P</i>	HR (95%CI)	<i>P</i>	
CKD	Adipose	1.04 (0.93, 1.17)	0.485	1.19 (1.12, 1.27)	<0.001	<0.001
CKD	Artery	1.21 (1.06, 1.38)	0.005	1.23 (1.15, 1.31)	<0.001	0.025
CKD	Brain	0.96 (0.84, 1.09)	0.521	1.09 (1.03, 1.15)	0.005	0.003
CKD	Heart	1.28 (1.13, 1.44)	<0.001	1.19 (1.13, 1.25)	<0.001	0.137
CKD	Immune	1.06 (0.91, 1.23)	0.459	1.07 (1.01, 1.13)	0.032	0.009
CKD	Intestine	1.08 (0.93, 1.24)	0.317	1.21 (1.13, 1.29)	<0.001	<0.001
CKD	Kidney	1.18 (1.05, 1.31)	0.004	1.14 (1.07, 1.20)	<0.001	0.001
CKD	Liver	1.05 (0.92, 1.20)	0.467	1.07 (1.00, 1.13)	0.034	0.002
CKD	Lung	1.19 (1.03, 1.36)	0.014	1.22 (1.15, 1.29)	<0.001	0.017
CKD	Muscle	1.17 (1.04, 1.32)	0.007	1.15 (1.10, 1.22)	<0.001	0.179
CKD	Pancreas	1.32 (1.17, 1.49)	<0.001	1.33 (1.25, 1.41)	<0.001	<0.001
CVD	Adipose	0.96 (0.86, 1.06)	0.408	0.94 (0.90, 0.99)	0.022	0.630
CVD	Artery	1.03 (0.91, 1.17)	0.612	1.05 (1.00, 1.10)	0.045	0.433
CVD	Brain	1.17 (1.04, 1.31)	0.008	1.17 (1.12, 1.22)	<0.001	0.659
CVD	Heart	1.47 (1.32, 1.64)	<0.001	1.34 (1.29, 1.39)	<0.001	0.399
CVD	Immune	0.90 (0.79, 1.02)	0.101	1.00 (0.96, 1.05)	0.932	0.018
CVD	Intestine	1.10 (0.98, 1.25)	0.119	1.08 (1.03, 1.13)	0.002	0.622
CVD	Kidney	1.07 (0.97, 1.18)	0.182	1.03 (0.98, 1.08)	0.213	0.843
CVD	Liver	0.93 (0.82, 1.05)	0.214	1.03 (0.99, 1.08)	0.160	0.048
CVD	Lung	1.02 (0.91, 1.15)	0.698	1.06 (1.02, 1.11)	0.005	0.170
CVD	Muscle	0.98 (0.88, 1.09)	0.745	1.05 (1.01, 1.10)	0.008	0.047
CVD	Pancreas	1.12 (1.00, 1.25)	0.044	1.08 (1.04, 1.13)	<0.001	0.671
DR	Adipose	1.02 (0.90, 1.17)	0.737	0.67 (0.51, 0.88)	0.004	0.057
DR	Artery	1.19 (1.02, 1.39)	0.024	0.92 (0.71, 1.20)	0.538	<0.001
DR	Brain	1.25 (1.09, 1.44)	0.001	1.23 (1.00, 1.51)	0.054	0.597
DR	Heart	1.03 (0.90, 1.19)	0.661	0.79 (0.62, 1.00)	0.050	0.005
DR	Immune	0.99 (0.85, 1.16)	0.899	1.39 (1.08, 1.80)	0.010	0.001
DR	Intestine	0.94 (0.81, 1.10)	0.470	1.12 (0.84, 1.48)	0.446	0.001
DR	Kidney	1.07 (0.94, 1.21)	0.304	1.36 (1.09, 1.69)	0.007	<0.001
DR	Liver	0.92 (0.78, 1.08)	0.306	0.92 (0.72, 1.16)	0.477	0.753
DR	Lung	0.94 (0.82, 1.08)	0.411	0.96 (0.74, 1.23)	0.745	0.830
DR	Muscle	1.15 (1.02, 1.31)	0.028	0.93 (0.74, 1.17)	0.527	0.607

DR	Pancreas	1.11 (0.97, 1.27)	0.120	1.48 (1.16, 1.90)	0.002	<0.001
Death	Adipose	0.95 (0.86, 1.06)	0.360	1.00 (0.96, 1.05)	0.998	0.341
Death	Artery	1.15 (1.02, 1.29)	0.024	1.07 (1.02, 1.11)	0.003	0.408
Death	Brain	1.30 (1.17, 1.45)	<0.001	1.42 (1.37, 1.47)	<0.001	0.007
Death	Heart	1.16 (1.04, 1.28)	0.007	1.10 (1.07, 1.14)	<0.001	0.816
Death	Immune	0.84 (0.74, 0.95)	0.007	1.06 (1.02, 1.11)	0.002	<0.001
Death	Intestine	1.04 (0.92, 1.18)	0.496	1.01 (0.97, 1.06)	0.512	0.190
Death	Kidney	1.06 (0.96, 1.17)	0.285	1.07 (1.03, 1.12)	<0.001	0.121
Death	Liver	0.95 (0.84, 1.07)	0.386	0.96 (0.92, 1.00)	0.048	0.257
Death	Lung	1.19 (1.06, 1.34)	0.002	1.04 (1.00, 1.08)	0.039	0.770
Death	Muscle	0.92 (0.82, 1.02)	0.104	1.06 (1.02, 1.10)	0.001	0.002
Death	Pancreas	1.05 (0.95, 1.18)	0.344	1.14 (1.09, 1.18)	<0.001	0.005
PAD	Adipose	0.85 (0.69, 1.04)	0.118	0.91 (0.80, 1.03)	0.128	0.477
PAD	Artery	1.03 (0.81, 1.30)	0.836	1.05 (0.93, 1.18)	0.455	0.526
PAD	Brain	1.34 (1.07, 1.67)	0.011	1.17 (1.06, 1.30)	0.002	0.811
PAD	Heart	1.59 (1.28, 1.97)	<0.001	1.24 (1.14, 1.36)	<0.001	0.706
PAD	Immune	0.90 (0.70, 1.16)	0.400	1.08 (0.97, 1.20)	0.184	0.086
PAD	Intestine	0.91 (0.71, 1.16)	0.448	1.03 (0.92, 1.16)	0.578	0.057
PAD	Kidney	1.34 (1.10, 1.63)	0.004	1.18 (1.06, 1.30)	0.002	0.586
PAD	Liver	0.98 (0.76, 1.26)	0.878	1.02 (0.91, 1.14)	0.721	0.230
PAD	Lung	1.14 (0.90, 1.43)	0.270	1.13 (1.01, 1.25)	0.025	0.196
PAD	Muscle	0.97 (0.79, 1.20)	0.802	1.08 (0.98, 1.19)	0.105	0.252
PAD	Pancreas	0.97 (0.78, 1.22)	0.802	1.12 (1.01, 1.25)	0.040	0.102

HRs (per 1-SD increment) have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, glucose levels, and concurrent organ aging gaps. CI: confidence interval; CKD: chronic kidney disease; CVD: cardiovascular disease; DR: diabetic retinopathy; HR: hazard ratio; PAD: peripheral artery disease; SD: standard deviation.

Table S12. Cumulative Burden of Extreme Organ Aging and Complication Risks

	Adjusted HR (95%CI)	<i>P</i>
CVD		
No aged organ	Ref	
1-3 aged organ	1.359 (1.030, 1.792)	0.030
>3 aged organ	2.133 (1.506, 3.019)	<0.001
DR		
No aged organ	Ref	
1-3 aged organ	1.182 (0.839, 1.665)	0.340
>3 aged organ	2.448 (1.594, 3.760)	<0.001
PAD		
No aged organ	Ref	
1-3 aged organ	0.927 (0.538, 1.597)	0.784
>3 aged organ	2.327 (1.237, 4.378)	0.009
CKD		
No aged organ	Ref	
1-3 aged organ	2.560 (1.741, 3.764)	<0.001
>3 aged organ	7.302 (4.767, 11.186)	<0.001
All-cause mortality		
No aged organ	Ref	
1-3 aged organ	1.640 (1.237, 2.172)	0.001
>3 aged organ	2.332 (1.642, 3.311)	<0.001

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

CI: confidence interval; CKD: chronic kidney disease; CVD: cardiovascular disease; DR: diabetic retinopathy;

HR: hazard ratio; PAD: peripheral artery disease.

Table S13. Dual-Organ Co-Aging and Cardiovascular Disease Risk in Diabetes

Organ1	Organ2	Adjusted HR (95%CI)	<i>P</i>
Heart	Muscle	5.32 (3.00, 9.41)	<0.001
Brain	Heart	4.17 (2.66, 6.52)	<0.001
Heart	Kidney	3.58 (2.39, 5.34)	<0.001
Heart	Pancreas	3.45 (2.30, 5.18)	<0.001
Brain	Artery	3.25 (1.95, 5.42)	<0.001
Artery	Heart	3.14 (1.93, 5.11)	<0.001
Artery	Intestine	3.04 (1.92, 4.81)	<0.001
Intestine	Heart	2.88 (1.80, 4.61)	<0.001
Artery	Lung	2.83 (1.25, 6.40)	0.012
Immune	Heart	2.74 (1.66, 4.51)	<0.001
Artery	Pancreas	2.66 (1.66, 4.25)	<0.001
Artery	Kidney	2.52 (1.60, 3.94)	<0.001
Liver	Heart	2.39 (1.43, 4.00)	<0.001
Heart	Adipose	2.25 (1.34, 3.79)	0.002
Artery	Adipose	2.20 (1.24, 3.91)	0.007
Artery	Immune	2.16 (1.28, 3.65)	0.004
Brain	Intestine	2.15 (1.46, 3.17)	<0.001
Brain	Muscle	2.14 (1.22, 3.76)	0.008
Artery	Muscle	2.13 (1.05, 4.31)	0.037
Lung	Muscle	2.06 (0.97, 4.37)	0.062
Brain	Kidney	1.94 (1.34, 2.80)	<0.001
Lung	Heart	1.91 (0.60, 6.11)	0.272
Brain	Pancreas	1.90 (1.26, 2.85)	0.002
Brain	Immune	1.89 (1.23, 2.88)	0.003
Artery	Liver	1.85 (1.05, 3.27)	0.034
Lung	Adipose	1.82 (1.02, 3.25)	0.043
Intestine	Pancreas	1.75 (1.29, 2.37)	<0.001
Muscle	Adipose	1.57 (0.89, 2.77)	0.119
Liver	Pancreas	1.57 (1.01, 2.44)	0.046
Pancreas	Kidney	1.52 (1.12, 2.06)	0.008
Intestine	Adipose	1.51 (0.98, 2.34)	0.062
Intestine	Lung	1.48 (0.88, 2.47)	0.14
Brain	Liver	1.46 (0.81, 2.62)	0.204
Pancreas	Adipose	1.45 (0.96, 2.19)	0.076

Immune	Intestine	1.45 (0.97, 2.17)	0.067
Brain	Adipose	1.39 (0.81, 2.41)	0.235
Intestine	Kidney	1.39 (1.01, 1.91)	0.045
Liver	Kidney	1.36 (0.88, 2.11)	0.171
Immune	Adipose	1.34 (0.83, 2.17)	0.232
Lung	Pancreas	1.32 (0.79, 2.20)	0.289
Brain	Lung	1.26 (0.59, 2.68)	0.546
Liver	Intestine	1.24 (0.75, 2.03)	0.406
Muscle	Kidney	1.23 (0.77, 1.98)	0.383
Immune	Pancreas	1.20 (0.81, 1.77)	0.37
Liver	Immune	1.18 (0.73, 1.92)	0.495
Lung	Kidney	1.17 (0.69, 1.99)	0.564
Immune	Kidney	1.15 (0.79, 1.68)	0.468
Pancreas	Muscle	1.14 (0.66, 1.97)	0.631
Adipose	Kidney	1.13 (0.75, 1.72)	0.556
Immune	Muscle	1.05 (0.56, 1.98)	0.879
Liver	Adipose	1.04 (0.56, 1.93)	0.899
Liver	Muscle	1.01 (0.41, 2.45)	0.988
Intestine	Muscle	0.94 (0.53, 1.69)	0.843
Immune	Lung	0.81 (0.42, 1.53)	0.513
Liver	Lung	0.71 (0.29, 1.75)	0.462

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

CI: confidence interval; HR: hazard ratio.

Table S14. Dual-Organ Co-Aging and Diabetic Retinopathy Risk

Organ1	Organ2	Adjusted HR (95%CI)	<i>P</i>
Lung	Heart	8.80 (2.69, 28.77)	<0.001
Heart	Muscle	6.27 (3.03, 12.96)	<0.001
Artery	Muscle	5.72 (3.08, 10.63)	<0.001
Brain	Muscle	5.28 (3.18, 8.77)	<0.001
Brain	Artery	4.93 (2.88, 8.45)	<0.001
Artery	Kidney	3.96 (2.34, 6.67)	<0.001
Artery	Heart	3.78 (2.09, 6.86)	<0.001
Artery	Adipose	3.69 (1.91, 7.11)	<0.001
Brain	Heart	3.57 (1.91, 6.66)	<0.001
Liver	Muscle	3.17 (1.47, 6.81)	0.003
Brain	Adipose	3.07 (1.79, 5.25)	<0.001
Immune	Heart	3.05 (1.59, 5.85)	<0.001
Muscle	Kidney	3.04 (1.89, 4.88)	<0.001
Artery	Pancreas	3.03 (1.74, 5.25)	<0.001
Muscle	Adipose	3.01 (1.64, 5.51)	<0.001
Heart	Adipose	2.98 (1.64, 5.43)	<0.001
Pancreas	Muscle	2.97 (1.80, 4.90)	<0.001
Heart	Kidney	2.87 (1.64, 5.01)	<0.001
Brain	Liver	2.82 (1.52, 5.23)	0.001
Brain	Kidney	2.65 (1.73, 4.06)	<0.001
Heart	Pancreas	2.62 (1.55, 4.43)	<0.001
Artery	Immune	2.59 (1.39, 4.80)	0.003
Artery	Intestine	2.44 (1.32, 4.53)	0.005
Artery	Lung	2.44 (0.77, 7.70)	0.129
Liver	Intestine	2.41 (1.41, 4.10)	0.001
Artery	Liver	2.29 (1.07, 4.90)	0.034
Adipose	Kidney	2.22 (1.37, 3.59)	0.001
Brain	Pancreas	2.17 (1.36, 3.47)	0.001
Liver	Kidney	2.13 (1.21, 3.73)	0.009
Immune	Muscle	2.11 (1.18, 3.76)	0.011
Brain	Intestine	2.06 (1.27, 3.35)	0.003
Pancreas	Kidney	2.03 (1.40, 2.95)	<0.001
Liver	Pancreas	1.99 (1.17, 3.41)	0.011
Intestine	Muscle	1.95 (1.08, 3.53)	0.028

Brain	Immune	1.94 (1.16, 3.24)	0.012
Intestine	Heart	1.93 (1.02, 3.68)	0.044
Liver	Heart	1.91 (0.89, 4.11)	0.096
Liver	Immune	1.84 (1.04, 3.26)	0.037
Immune	Adipose	1.72 (0.95, 3.08)	0.071
Immune	Intestine	1.71 (1.06, 2.74)	0.026
Liver	Adipose	1.68 (0.78, 3.63)	0.184
Pancreas	Adipose	1.63 (0.98, 2.69)	0.058
Intestine	Pancreas	1.55 (1.04, 2.29)	0.029
Intestine	Kidney	1.54 (1.02, 2.33)	0.038
Intestine	Adipose	1.41 (0.78, 2.54)	0.253
Immune	Pancreas	1.33 (0.84, 2.12)	0.224
Immune	Kidney	1.32 (0.82, 2.13)	0.26
Lung	Muscle	1.20 (0.38, 3.80)	0.758
Lung	Pancreas	1.01 (0.47, 2.17)	0.985
Liver	Lung	0.93 (0.23, 3.81)	0.925
Immune	Lung	0.89 (0.39, 2.03)	0.776
Intestine	Lung	0.88 (0.36, 2.18)	0.786
Brain	Lung	0.86 (0.27, 2.71)	0.796
Lung	Kidney	0.54 (0.20, 1.47)	0.225
Lung	Adipose	0.46 (0.11, 1.90)	0.284

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

CI: confidence interval; HR: hazard ratio.

Table S15. Dual-Organ Co-Aging and Peripheral Artery Disease Risk

Organ1	Organ2	Adjusted HR (95%CI)	P
Lung	Heart	11.25 (2.53, 49.99)	0.001
Artery	Lung	9.37 (3.34, 26.24)	<0.001
Brain	Artery	8.44 (4.08, 17.46)	<0.001
Brain	Heart	5.32 (2.37, 11.90)	<0.001
Heart	Muscle	5.09 (1.81, 14.33)	0.002
Artery	Kidney	4.30 (2.11, 8.74)	<0.001
Heart	Kidney	4.23 (2.05, 8.71)	<0.001
Artery	Immune	4.13 (1.86, 9.17)	<0.001
Artery	Heart	3.93 (1.68, 9.20)	0.002
Artery	Pancreas	3.41 (1.55, 7.50)	0.002
Heart	Adipose	2.80 (1.11, 7.08)	0.03
Brain	Lung	2.75 (1.06, 7.09)	0.037
Artery	Intestine	2.70 (1.08, 6.76)	0.034
Artery	Muscle	2.68 (0.84, 8.56)	0.097
Artery	Liver	2.66 (0.95, 7.44)	0.063
Brain	Pancreas	2.65 (1.37, 5.11)	0.004
Heart	Pancreas	2.62 (1.18, 5.81)	0.018
Brain	Kidney	2.59 (1.40, 4.80)	0.002
Liver	Heart	2.50 (0.90, 6.96)	0.08
Brain	Immune	2.48 (1.21, 5.09)	0.013
Artery	Adipose	2.40 (0.74, 7.85)	0.147
Brain	Liver	2.33 (0.84, 6.48)	0.105
Immune	Heart	2.21 (0.79, 6.13)	0.129
Liver	Muscle	2.09 (0.65, 6.74)	0.217
Liver	Pancreas	1.92 (0.87, 4.25)	0.106
Brain	Intestine	1.78 (0.87, 3.65)	0.116
Lung	Muscle	1.69 (0.40, 7.05)	0.475
Intestine	Kidney	1.68 (0.94, 3.01)	0.082
Liver	Immune	1.67 (0.72, 3.90)	0.232
Muscle	Adipose	1.64 (0.58, 4.64)	0.35
Pancreas	Kidney	1.56 (0.87, 2.79)	0.132
Lung	Pancreas	1.52 (0.63, 3.67)	0.346
Immune	Kidney	1.50 (0.77, 2.93)	0.231
Brain	Muscle	1.45 (0.45, 4.63)	0.532

Lung	Kidney	1.44 (0.59, 3.51)	0.422
Immune	Lung	1.40 (0.49, 4.03)	0.534
Immune	Muscle	1.38 (0.49, 3.87)	0.539
Muscle	Kidney	1.33 (0.56, 3.11)	0.517
Liver	Kidney	1.27 (0.50, 3.26)	0.613
Liver	Intestine	1.24 (0.45, 3.46)	0.675
Intestine	Pancreas	1.21 (0.65, 2.25)	0.539
Brain	Adipose	1.21 (0.43, 3.39)	0.721
Pancreas	Adipose	1.18 (0.53, 2.59)	0.688
Immune	Intestine	1.11 (0.49, 2.49)	0.801
Intestine	Lung	1.08 (0.37, 3.10)	0.892
Pancreas	Muscle	1.04 (0.38, 2.89)	0.937
Intestine	Heart	1.03 (0.25, 4.22)	0.968
Liver	Lung	0.96 (0.13, 7.10)	0.97
Adipose	Kidney	0.93 (0.40, 2.14)	0.863
Immune	Pancreas	0.85 (0.38, 1.89)	0.692
Intestine	Muscle	0.84 (0.26, 2.68)	0.767
Liver	Adipose	0.78 (0.19, 3.24)	0.735
Immune	Adipose	0.62 (0.19, 2.04)	0.43
Intestine	Adipose	0.28 (0.07, 1.17)	0.082
Lung	Adipose	0.27 (0.04, 2.07)	0.21

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

CI: confidence interval; HR: hazard ratio.

Table S16. Dual-Organ Co-Aging and Chronic Kidney Disease Risk

Organ1	Organ2	Adjusted HR (95%CI)	<i>P</i>
Artery	Lung	7.37 (3.42, 15.88)	<0.001
Brain	Artery	5.73 (3.53, 9.29)	<0.001
Lung	Muscle	5.42 (2.74, 10.70)	<0.001
Liver	Muscle	5.40 (2.98, 9.76)	<0.001
Lung	Heart	5.36 (1.93, 14.85)	0.001
Artery	Muscle	5.12 (2.77, 9.45)	<0.001
Heart	Pancreas	5.09 (3.43, 7.55)	<0.001
Heart	Muscle	5.03 (2.64, 9.58)	<0.001
Artery	Heart	4.96 (3.11, 7.93)	<0.001
Liver	Heart	4.77 (3.00, 7.59)	<0.001
Artery	Pancreas	4.67 (2.98, 7.31)	<0.001
Heart	Adipose	4.47 (2.84, 7.04)	<0.001
Heart	Kidney	4.30 (2.79, 6.61)	<0.001
Pancreas	Muscle	3.97 (2.62, 6.03)	<0.001
Immune	Muscle	3.95 (2.50, 6.25)	<0.001
Artery	Intestine	3.93 (2.43, 6.34)	<0.001
Artery	Kidney	3.92 (2.50, 6.13)	<0.001
Brain	Heart	3.80 (2.29, 6.33)	<0.001
Intestine	Heart	3.69 (2.32, 5.88)	<0.001
Pancreas	Adipose	3.66 (2.54, 5.28)	<0.001
Liver	Intestine	3.57 (2.39, 5.34)	<0.001
Artery	Adipose	3.55 (2.05, 6.15)	<0.001
Liver	Pancreas	3.50 (2.38, 5.17)	<0.001
Immune	Heart	3.46 (2.05, 5.82)	<0.001
Muscle	Kidney	3.42 (2.28, 5.13)	<0.001
Lung	Pancreas	3.40 (2.20, 5.27)	<0.001
Intestine	Lung	3.39 (2.12, 5.41)	<0.001
Liver	Adipose	3.32 (2.06, 5.34)	<0.001
Artery	Liver	3.24 (1.95, 5.41)	<0.001
Intestine	Pancreas	3.17 (2.35, 4.27)	<0.001
Brain	Muscle	3.16 (1.76, 5.68)	<0.001
Immune	Pancreas	3.02 (2.13, 4.28)	<0.001
Intestine	Muscle	3.00 (1.90, 4.71)	<0.001
Immune	Lung	2.99 (1.81, 4.94)	<0.001

Immune	Intestine	2.98 (2.05, 4.35)	<0.001
Pancreas	Kidney	2.98 (2.18, 4.08)	<0.001
Muscle	Adipose	2.97 (1.76, 5.03)	<0.001
Intestine	Adipose	2.97 (2.00, 4.41)	<0.001
Lung	Kidney	2.87 (1.80, 4.60)	<0.001
Artery	Immune	2.87 (1.69, 4.88)	<0.001
Immune	Adipose	2.64 (1.72, 4.06)	<0.001
Brain	Immune	2.63 (1.69, 4.10)	<0.001
Intestine	Kidney	2.58 (1.88, 3.54)	<0.001
Liver	Kidney	2.56 (1.69, 3.87)	<0.001
Brain	Pancreas	2.52 (1.67, 3.81)	<0.001
Lung	Adipose	2.50 (1.42, 4.40)	0.002
Brain	Kidney	2.39 (1.61, 3.56)	<0.001
Brain	Lung	2.38 (1.21, 4.68)	0.012
Brain	Liver	2.38 (1.37, 4.12)	0.002
Brain	Intestine	2.35 (1.55, 3.56)	<0.001
Brain	Adipose	2.31 (1.41, 3.79)	<0.001
Adipose	Kidney	2.20 (1.49, 3.26)	<0.001
Liver	Lung	2.02 (0.98, 4.16)	0.056
Immune	Kidney	2.02 (1.39, 2.94)	<0.001
Liver	Immune	1.71 (1.06, 2.76)	0.027

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

CI: confidence interval; HR: hazard ratio.

Table S17. Dual-Organ Co-Aging and All-Cause Mortality Risk

Organ1	Organ2	Adjusted HR (95%CI)	<i>P</i>
Artery	Lung	5.51 (3.07, 9.91)	<0.001
Lung	Heart	4.25 (1.96, 9.24)	<0.001
Brain	Artery	3.92 (2.49, 6.18)	<0.001
Brain	Heart	3.27 (2.10, 5.11)	<0.001
Brain	Lung	2.95 (1.81, 4.82)	<0.001
Heart	Pancreas	2.78 (1.89, 4.08)	<0.001
Brain	Muscle	2.63 (1.61, 4.32)	<0.001
Artery	Pancreas	2.58 (1.66, 4.01)	<0.001
Brain	Pancreas	2.50 (1.76, 3.56)	<0.001
Artery	Intestine	2.49 (1.54, 4.04)	<0.001
Intestine	Heart	2.47 (1.55, 3.95)	<0.001
Heart	Kidney	2.27 (1.48, 3.48)	<0.001
Heart	Muscle	2.22 (1.14, 4.35)	0.019
Lung	Muscle	2.19 (1.08, 4.46)	0.03
Brain	Liver	2.19 (1.33, 3.60)	0.002
Artery	Muscle	2.11 (1.08, 4.11)	0.029
Brain	Intestine	2.08 (1.44, 3.01)	<0.001
Lung	Kidney	2.06 (1.36, 3.11)	<0.001
Brain	Kidney	2.03 (1.43, 2.89)	<0.001
Artery	Kidney	1.96 (1.22, 3.14)	0.005
Heart	Adipose	1.87 (1.13, 3.10)	0.015
Immune	Heart	1.84 (1.09, 3.11)	0.023
Liver	Pancreas	1.83 (1.23, 2.73)	0.003
Artery	Immune	1.81 (1.06, 3.12)	0.031
Muscle	Kidney	1.81 (1.22, 2.69)	0.003
Artery	Heart	1.78 (1.04, 3.07)	0.037
Lung	Pancreas	1.74 (1.13, 2.69)	0.013
Intestine	Lung	1.72 (1.09, 2.73)	0.02
Liver	Intestine	1.71 (1.12, 2.62)	0.013
Liver	Adipose	1.70 (1.05, 2.76)	0.03
Brain	Immune	1.69 (1.10, 2.60)	0.017
Artery	Liver	1.69 (0.98, 2.92)	0.061
Liver	Heart	1.65 (0.96, 2.85)	0.071
Intestine	Pancreas	1.64 (1.22, 2.21)	0.001

Artery	Adipose	1.59 (0.85, 2.95)	0.145
Liver	Kidney	1.58 (1.06, 2.37)	0.025
Immune	Muscle	1.51 (0.88, 2.60)	0.136
Pancreas	Kidney	1.51 (1.12, 2.03)	0.007
Immune	Lung	1.50 (0.89, 2.52)	0.126
Pancreas	Muscle	1.48 (0.94, 2.35)	0.093
Liver	Lung	1.46 (0.74, 2.88)	0.272
Liver	Immune	1.45 (0.94, 2.23)	0.094
Immune	Kidney	1.40 (0.99, 1.99)	0.057
Pancreas	Adipose	1.36 (0.91, 2.02)	0.129
Intestine	Kidney	1.35 (0.98, 1.84)	0.063
Liver	Muscle	1.31 (0.62, 2.79)	0.479
Brain	Adipose	1.30 (0.78, 2.18)	0.318
Intestine	Muscle	1.28 (0.78, 2.10)	0.323
Immune	Intestine	1.28 (0.85, 1.92)	0.231
Immune	Pancreas	1.28 (0.88, 1.86)	0.192
Muscle	Adipose	1.15 (0.62, 2.13)	0.649
Lung	Adipose	1.15 (0.62, 2.14)	0.662
Intestine	Adipose	1.15 (0.74, 1.79)	0.54
Immune	Adipose	1.13 (0.69, 1.85)	0.64
Adipose	Kidney	1.11 (0.74, 1.67)	0.609

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

CI: confidence interval; HR: hazard ratio.

Table S18. Interaction Analysis: Dual-Organ Co-Aging and Diabetic Retinopathy Risk

Organ pair		Adjusted HR (95%CI)				Additive joint interaction	
Organ1	Organ2	Both young	Organ1 aged	Organ2 aged	Both aged	RERI	AP
Brain	Artery	1.00 (Reference)	1.74 (1.19, 2.54)	2.26 (1.24, 4.10)	5.68 (3.29, 9.79)	2.67 (-0.27, 6.78)	0.47 (-0.11, 0.70)
Brain	Liver	1.00 (Reference)	1.93 (1.34, 2.78)	1.13 (0.61, 2.11)	3.14 (1.68, 5.86)	1.08 (-0.78, 3.81)	0.34 (-0.50, 0.60)
Brain	Immune	1.00 (Reference)	2.00 (1.36, 2.95)	0.81 (0.51, 1.27)	2.08 (1.23, 3.51)	0.27 (-0.99, 1.74)	0.13 (-0.75, 0.48)
Brain	Intestine	1.00 (Reference)	2.05 (1.37, 3.07)	1.13 (0.76, 1.68)	2.34 (1.43, 3.85)	0.17 (-1.20, 1.71)	0.07 (-0.76, 0.43)
Brain	Lung	1.00 (Reference)	2.22 (1.58, 3.12)	0.73 (0.34, 1.58)	0.98 (0.31, 3.11)	-0.98 (-2.39, 1.22)	-0.99 (-7.24, -0.37)
Brain	Heart	1.00 (Reference)	1.95 (1.35, 2.81)	2.15 (1.31, 3.55)	4.27 (2.27, 8.03)	1.17 (-1.27, 4.92)	0.27 (-0.58, 0.57)
Brain	Pancreas	1.00 (Reference)	2.22 (1.47, 3.37)	1.65 (1.17, 2.34)	2.80 (1.72, 4.56)	-0.08 (-1.65, 1.69)	-0.03 (-0.85, 0.35)
Brain	Muscle	1.00 (Reference)	1.61 (1.09, 2.36)	1.07 (0.66, 1.76)	5.80 (3.46, 9.71)	4.12 (1.73, 7.96)	0.71 (0.41, 0.83)
Brain	Adipose	1.00 (Reference)	1.80 (1.23, 2.64)	1.02 (0.61, 1.70)	3.34 (1.93, 5.77)	1.51 (-0.12, 3.92)	0.45 (-0.14, 0.67)
Brain	Kidney	1.00 (Reference)	1.73 (1.10, 2.72)	1.21 (0.84, 1.74)	3.00 (1.91, 4.72)	1.06 (-0.32, 2.73)	0.35 (-0.19, 0.60)
Artery	Liver	1.00 (Reference)	3.49 (2.16, 5.64)	1.41 (0.82, 2.41)	2.53 (1.18, 5.45)	-1.36 (-4.06, 1.80)	-0.54 (-2.93, 0.16)
Artery	Immune	1.00 (Reference)	3.30 (1.94, 5.59)	0.83 (0.55, 1.26)	2.65 (1.42, 4.95)	-0.48 (-3.04, 2.09)	-0.18 (-1.75, 0.38)
Artery	Intestine	1.00 (Reference)	3.63 (2.14, 6.15)	1.19 (0.83, 1.70)	2.73 (1.46, 5.09)	-1.08 (-3.87, 1.59)	-0.40 (-2.14, 0.25)
Artery	Lung	1.00 (Reference)	3.06 (1.97, 4.75)	0.56 (0.26, 1.21)	2.56 (0.81, 8.09)	-0.07 (-2.55, 5.53)	-0.03 (-3.14, 0.31)
Artery	Heart	1.00 (Reference)	2.75 (1.60, 4.70)	2.00 (1.20, 3.33)	4.26 (2.34, 7.77)	0.52 (-2.42, 4.14)	0.12 (-0.92, 0.51)
Artery	Pancreas	1.00 (Reference)	3.30 (1.83, 5.92)	1.54 (1.11, 2.14)	3.64 (2.07, 6.41)	-0.20 (-3.18, 2.77)	-0.05 (-1.25, 0.42)
Artery	Muscle	1.00 (Reference)	2.38 (1.41, 4.02)	1.31 (0.85, 2.02)	6.29 (3.37, 11.73)	3.60 (0.33, 9.02)	0.57 (0.02, 0.76)
Artery	Adipose	1.00 (Reference)	2.79 (1.68, 4.66)	1.16 (0.73, 1.84)	4.02 (2.06, 7.82)	1.06 (-1.59, 4.92)	0.26 (-0.74, 0.59)

Artery	Kidney	1.00 (Reference)	2.39 (1.28, 4.48)	1.26 (0.90, 1.77)	4.50 (2.61, 7.75)	1.84 (-0.82, 5.11)	0.41 (-0.30, 0.68)
Liver	Immune	1.00 (Reference)	1.16 (0.59, 2.30)	0.81 (0.53, 1.23)	1.78 (1.00, 3.17)	0.81 (-0.58, 2.27)	0.45 (-0.55, 0.79)
Liver	Intestine	1.00 (Reference)	0.85 (0.40, 1.83)	1.04 (0.71, 1.50)	2.40 (1.40, 4.13)	1.52 (0.11, 3.25)	0.63 (-0.01, 0.86)
Liver	Lung	1.00 (Reference)	1.55 (0.97, 2.49)	0.67 (0.33, 1.38)	0.95 (0.23, 3.90)	-0.27 (-1.65, 2.72)	-0.28 (-7.30, 1.36)
Liver	Heart	1.00 (Reference)	1.50 (0.87, 2.56)	2.61 (1.66, 4.10)	2.19 (1.02, 4.73)	-0.91 (-3.05, 1.76)	-0.41 (-2.62, 0.18)
Liver	Pancreas	1.00 (Reference)	1.10 (0.51, 2.37)	1.54 (1.11, 2.13)	2.29 (1.32, 3.95)	0.66 (-0.96, 2.36)	0.29 (-0.65, 0.60)
Liver	Muscle	1.00 (Reference)	1.28 (0.74, 2.19)	1.49 (1.00, 2.24)	3.40 (1.58, 7.35)	1.63 (-0.47, 5.57)	0.48 (-0.43, 0.68)
Liver	Adipose	1.00 (Reference)	1.51 (0.88, 2.59)	1.36 (0.88, 2.12)	1.86 (0.86, 4.04)	-0.01 (-1.63, 2.21)	-0.01 (-1.77, 0.39)
Liver	Kidney	1.00 (Reference)	1.09 (0.53, 2.25)	1.33 (0.95, 1.85)	2.42 (1.35, 4.35)	1.00 (-0.55, 2.90)	0.41 (-0.41, 0.68)
Immune	Intestine	1.00 (Reference)	0.70 (0.43, 1.13)	1.01 (0.67, 1.51)	1.61 (0.99, 2.62)	0.91 (0.07, 1.92)	0.56 (-0.03, 0.83)
Immune	Lung	1.00 (Reference)	0.97 (0.66, 1.42)	0.51 (0.19, 1.39)	0.86 (0.37, 1.98)	0.38 (-0.71, 1.54)	0.44 (-1.81, 1.24)
Immune	Heart	1.00 (Reference)	0.85 (0.56, 1.27)	2.07 (1.27, 3.37)	3.12 (1.61, 6.03)	1.21 (-0.73, 4.14)	0.39 (-0.49, 0.65)
Immune	Pancreas	1.00 (Reference)	0.88 (0.53, 1.44)	1.65 (1.17, 2.33)	1.50 (0.93, 2.44)	-0.03 (-1.00, 0.95)	-0.02 (-0.94, 0.38)
Immune	Muscle	1.00 (Reference)	0.82 (0.54, 1.25)	1.39 (0.89, 2.19)	2.09 (1.16, 3.76)	0.87 (-0.35, 2.56)	0.42 (-0.38, 0.68)
Immune	Adipose	1.00 (Reference)	0.83 (0.54, 1.26)	1.18 (0.72, 1.92)	1.71 (0.94, 3.11)	0.70 (-0.37, 2.11)	0.41 (-0.46, 0.71)
Immune	Kidney	1.00 (Reference)	0.86 (0.53, 1.42)	1.37 (0.97, 1.94)	1.47 (0.88, 2.45)	0.24 (-0.65, 1.19)	0.16 (-0.67, 0.51)
Intestine	Lung	1.00 (Reference)	1.27 (0.91, 1.78)	0.59 (0.24, 1.46)	0.91 (0.37, 2.27)	0.05 (-1.09, 1.45)	0.05 (-2.83, 0.75)
Intestine	Heart	1.00 (Reference)	1.26 (0.88, 1.80)	2.77 (1.69, 4.54)	2.20 (1.15, 4.21)	-0.83 (-2.91, 1.37)	-0.38 (-2.13, 0.22)
Intestine	Pancreas	1.00 (Reference)	1.09 (0.67, 1.77)	1.60 (1.11, 2.32)	1.75 (1.16, 2.64)	0.05 (-1.00, 1.01)	0.03 (-0.73, 0.41)
Intestine	Muscle	1.00 (Reference)	1.20 (0.84, 1.73)	1.56 (1.00, 2.44)	2.12 (1.16, 3.89)	0.36 (-0.98, 2.15)	0.17 (-0.84, 0.49)
Intestine	Adipose	1.00 (Reference)	1.25 (0.87, 1.80)	1.39 (0.85, 2.27)	1.55 (0.85, 2.83)	-0.09 (-1.27, 1.24)	-0.06 (-1.34, 0.36)

Intestine	Kidney	1.00 (Reference)	1.10 (0.69, 1.76)	1.33 (0.92, 1.92)	1.73 (1.11, 2.70)	0.31 (-0.66, 1.26)	0.18 (-0.51, 0.51)
Lung	Heart	1.00 (Reference)	0.53 (0.25, 1.14)	2.14 (1.40, 3.27)	9.08 (2.77, 29.83)	7.42 (1.06, 28.12)	0.82 (0.17, 0.90)
Lung	Pancreas	1.00 (Reference)	0.45 (0.14, 1.42)	1.67 (1.22, 2.28)	1.16 (0.53, 2.52)	0.05 (-1.23, 1.44)	0.04 (-2.07, 0.46)
Lung	Muscle	1.00 (Reference)	0.62 (0.29, 1.33)	1.65 (1.13, 2.42)	1.23 (0.39, 3.91)	-0.04 (-1.37, 2.68)	-0.03 (-3.85, 0.66)
Lung	Adipose	1.00 (Reference)	0.81 (0.40, 1.67)	1.51 (1.00, 2.26)	0.51 (0.12, 2.11)	-0.81 (-2.04, 0.87)	-1.60 (-15.40, 1.44)
Lung	Kidney	1.00 (Reference)	0.92 (0.40, 2.10)	1.51 (1.09, 2.08)	0.65 (0.24, 1.82)	-0.77 (-2.16, 0.50)	-1.18 (-7.51, -0.18)
Heart	Pancreas	1.00 (Reference)	2.38 (1.33, 4.27)	1.56 (1.12, 2.16)	3.18 (1.85, 5.45)	0.23 (-2.03, 2.60)	0.07 (-0.92, 0.47)
Heart	Muscle	1.00 (Reference)	2.05 (1.29, 3.27)	1.45 (0.96, 2.19)	7.18 (3.44, 14.96)	4.67 (0.84, 12.38)	0.65 (0.14, 0.79)
Heart	Adipose	1.00 (Reference)	2.10 (1.26, 3.51)	1.12 (0.69, 1.81)	3.22 (1.75, 5.92)	1.00 (-1.03, 3.72)	0.31 (-0.57, 0.61)
Heart	Kidney	1.00 (Reference)	2.28 (1.31, 3.97)	1.39 (0.99, 1.96)	3.51 (1.96, 6.29)	0.83 (-1.35, 3.58)	0.24 (-0.62, 0.56)
Pancreas	Muscle	1.00 (Reference)	1.45 (1.04, 2.03)	1.24 (0.74, 2.08)	3.40 (2.03, 5.70)	1.70 (0.14, 3.95)	0.50 (-0.01, 0.70)
Pancreas	Adipose	1.00 (Reference)	1.62 (1.16, 2.26)	1.28 (0.72, 2.26)	1.90 (1.13, 3.20)	0.01 (-1.30, 1.34)	0.01 (-0.99, 0.40)
Pancreas	Kidney	1.00 (Reference)	1.35 (0.90, 2.05)	1.17 (0.78, 1.76)	2.26 (1.50, 3.41)	0.73 (-0.26, 1.80)	0.32 (-0.17, 0.59)
Muscle	Adipose	1.00 (Reference)	1.34 (0.86, 2.09)	1.10 (0.68, 1.78)	3.15 (1.70, 5.83)	1.71 (0.07, 4.36)	0.54 (-0.08, 0.73)
Muscle	Kidney	1.00 (Reference)	1.04 (0.60, 1.82)	1.22 (0.86, 1.72)	3.33 (2.01, 5.52)	2.07 (0.64, 4.17)	0.62 (0.21, 0.79)
Adipose	Kidney	1.00 (Reference)	0.87 (0.46, 1.63)	1.23 (0.87, 1.74)	2.37 (1.42, 3.95)	1.27 (0.11, 2.79)	0.54 (-0.01, 0.76)

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

AP: attributable proportion; CI: confidence interval; HR: hazard ratio; RERI: relative excess risk due to interaction.

Table S19. Interaction Analysis: Dual-Organ Co-Aging and Peripheral Artery Disease Risk

Organ pair		Adjusted HR (95%CI)				Additive joint interaction	
Organ1	Organ2	Both young	Organ1 aged	Organ2 aged	Both aged	RERI	AP
Brain	Artery	1.00 (Reference)	1.30 (0.69, 2.47)	1.72 (0.62, 4.78)	9.02 (4.31, 18.86)	6.99 (1.61, 16.72)	0.78 (0.25, 0.91)
Brain	Liver	1.00 (Reference)	2.02 (1.15, 3.56)	1.63 (0.73, 3.63)	2.72 (0.97, 7.67)	0.07 (-2.91, 4.99)	0.03 (-2.53, 0.43)
Brain	Immune	1.00 (Reference)	1.70 (0.90, 3.23)	0.89 (0.44, 1.77)	2.63 (1.25, 5.52)	1.04 (-1.03, 3.86)	0.40 (-0.73, 0.73)
Brain	Intestine	1.00 (Reference)	2.04 (1.07, 3.87)	0.85 (0.44, 1.64)	1.90 (0.91, 3.97)	0.01 (-2.13, 2.14)	0.01 (-1.76, 0.53)
Brain	Lung	1.00 (Reference)	1.88 (1.06, 3.32)	1.15 (0.45, 2.94)	3.14 (1.20, 8.24)	1.11 (-1.75, 6.14)	0.35 (-1.31, 0.66)
Brain	Heart	1.00 (Reference)	1.67 (0.91, 3.05)	2.73 (1.33, 5.61)	6.39 (2.80, 14.57)	3.00 (-1.43, 11.02)	0.47 (-0.51, 0.72)
Brain	Pancreas	1.00 (Reference)	1.62 (0.80, 3.29)	1.12 (0.64, 1.98)	2.92 (1.45, 5.85)	1.17 (-0.96, 3.97)	0.40 (-0.56, 0.72)
Brain	Muscle	1.00 (Reference)	2.17 (1.25, 3.76)	1.17 (0.55, 2.47)	1.71 (0.53, 5.51)	-0.63 (-3.00, 3.20)	-0.37 (-4.73, 0.17)
Brain	Adipose	1.00 (Reference)	2.39 (1.35, 4.22)	1.28 (0.62, 2.63)	1.43 (0.50, 4.11)	-1.23 (-3.69, 1.53)	-0.86 (-5.60, -0.12)
Brain	Kidney	1.00 (Reference)	1.55 (0.69, 3.51)	1.33 (0.76, 2.33)	3.04 (1.55, 5.97)	1.16 (-1.20, 3.91)	0.38 (-0.60, 0.71)
Artery	Liver	1.00 (Reference)	4.48 (2.17, 9.27)	1.55 (0.70, 3.43)	2.99 (1.06, 8.44)	-2.04 (-7.53, 3.75)	-0.68 (-5.05, 0.19)
Artery	Immune	1.00 (Reference)	3.11 (1.33, 7.29)	0.88 (0.47, 1.67)	4.27 (1.89, 9.62)	1.28 (-3.39, 6.70)	0.30 (-1.30, 0.71)
Artery	Intestine	1.00 (Reference)	4.33 (2.04, 9.20)	0.92 (0.51, 1.64)	2.92 (1.15, 7.40)	-1.33 (-6.44, 3.46)	-0.46 (-3.80, 0.34)
Artery	Lung	1.00 (Reference)	2.89 (1.42, 5.88)	0.99 (0.42, 2.35)	10.19 (3.61, 28.73)	7.31 (0.23, 25.76)	0.72 (-0.08, 0.85)
Artery	Heart	1.00 (Reference)	3.80 (1.72, 8.42)	3.23 (1.62, 6.43)	4.86 (2.05, 11.51)	-1.17 (-7.35, 5.61)	-0.24 (-2.61, 0.40)
Artery	Pancreas	1.00 (Reference)	4.01 (1.68, 9.57)	1.20 (0.70, 2.03)	3.85 (1.71, 8.71)	-0.35 (-6.18, 4.73)	-0.09 (-2.41, 0.53)
Artery	Muscle	1.00 (Reference)	4.02 (2.03, 7.98)	1.00 (0.48, 2.11)	2.99 (0.93, 9.62)	-1.04 (-5.56, 5.72)	-0.35 (-4.51, 0.27)
Artery	Adipose	1.00 (Reference)	4.33 (2.17, 8.62)	1.13 (0.57, 2.26)	2.69 (0.81, 8.94)	-1.76 (-6.52, 4.66)	-0.65 (-5.82, 0.12)

Artery	Kidney	1.00 (Reference)	2.96 (1.04, 8.41)	1.36 (0.80, 2.32)	5.15 (2.41, 11.02)	1.83 (-4.01, 7.62)	0.35 (-1.10, 0.73)
Liver	Immune	1.00 (Reference)	1.68 (0.66, 4.27)	1.06 (0.57, 1.96)	1.76 (0.74, 4.14)	0.02 (-2.85, 2.51)	0.01 (-2.62, 0.60)
Liver	Intestine	1.00 (Reference)	2.04 (0.91, 4.56)	1.02 (0.58, 1.81)	1.33 (0.47, 3.75)	-0.73 (-3.50, 1.84)	-0.55 (-5.14, 0.24)
Liver	Lung	1.00 (Reference)	1.92 (0.97, 3.80)	1.68 (0.81, 3.49)	1.14 (0.15, 8.50)	-1.46 (-4.34, 5.90)	-1.28 (-22.03, 1.84)
Liver	Heart	1.00 (Reference)	1.64 (0.74, 3.65)	3.68 (1.95, 6.95)	3.10 (1.10, 8.75)	-1.22 (-5.46, 4.47)	-0.40 (-3.77, 0.26)
Liver	Pancreas	1.00 (Reference)	1.45 (0.51, 4.09)	1.23 (0.72, 2.08)	2.10 (0.93, 4.77)	0.43 (-2.49, 3.11)	0.21 (-1.84, 0.68)
Liver	Muscle	1.00 (Reference)	1.56 (0.73, 3.33)	0.98 (0.46, 2.05)	2.18 (0.67, 7.08)	0.64 (-1.86, 5.54)	0.30 (-2.50, 0.78)
Liver	Adipose	1.00 (Reference)	2.29 (1.11, 4.70)	1.37 (0.70, 2.69)	0.92 (0.22, 3.88)	-1.74 (-4.69, 1.38)	-1.88 (-14.87, -0.56)
Liver	Kidney	1.00 (Reference)	2.58 (1.08, 6.17)	1.71 (1.02, 2.87)	1.79 (0.67, 4.80)	-1.50 (-5.43, 1.62)	-0.84 (-5.23, 0.04)
Immune	Intestine	1.00 (Reference)	1.18 (0.63, 2.24)	1.00 (0.54, 1.85)	1.14 (0.50, 2.62)	-0.04 (-1.51, 1.47)	-0.03 (-2.37, 0.60)
Immune	Lung	1.00 (Reference)	1.16 (0.65, 2.07)	1.53 (0.65, 3.62)	1.51 (0.52, 4.42)	-0.18 (-2.64, 2.76)	-0.12 (-3.79, 0.52)
Immune	Heart	1.00 (Reference)	1.21 (0.67, 2.18)	3.92 (2.04, 7.52)	2.65 (0.94, 7.50)	-1.47 (-5.48, 3.49)	-0.56 (-4.31, 0.18)
Immune	Pancreas	1.00 (Reference)	1.62 (0.84, 3.13)	1.63 (0.95, 2.79)	1.08 (0.47, 2.50)	-1.17 (-3.21, 0.38)	-1.08 (-4.71, -0.16)
Immune	Muscle	1.00 (Reference)	1.12 (0.63, 2.01)	1.01 (0.46, 2.23)	1.42 (0.50, 4.03)	0.29 (-1.44, 2.90)	0.20 (-2.55, 0.84)
Immune	Adipose	1.00 (Reference)	1.43 (0.80, 2.54)	1.50 (0.75, 2.98)	0.73 (0.22, 2.45)	-1.20 (-3.18, 0.64)	-1.65 (-10.71, -0.35)
Immune	Kidney	1.00 (Reference)	1.00 (0.45, 2.27)	1.50 (0.87, 2.60)	1.83 (0.88, 3.79)	0.32 (-1.42, 2.13)	0.17 (-1.18, 0.62)
Intestine	Lung	1.00 (Reference)	1.04 (0.59, 1.83)	1.82 (0.77, 4.31)	1.14 (0.39, 3.31)	-0.73 (-3.45, 1.61)	-0.64 (-6.03, 0.26)
Intestine	Heart	1.00 (Reference)	1.23 (0.71, 2.15)	4.73 (2.55, 8.80)	1.30 (0.31, 5.38)	-3.67 (-8.04, 0.80)	-2.83 (-17.76, -1.32)
Intestine	Pancreas	1.00 (Reference)	0.85 (0.38, 1.90)	1.31 (0.73, 2.35)	1.29 (0.67, 2.47)	0.12 (-1.41, 1.32)	0.10 (-1.46, 0.68)
Intestine	Muscle	1.00 (Reference)	1.07 (0.61, 1.86)	1.25 (0.59, 2.64)	0.87 (0.27, 2.82)	-0.45 (-2.19, 1.58)	-0.51 (-6.43, 0.68)
Intestine	Adipose	1.00 (Reference)	1.46 (0.85, 2.52)	2.10 (1.07, 4.12)	0.35 (0.08, 1.49)	-2.21 (-4.66, -0.62)	-6.34 (-39.04, -3.02)

Intestine	Kidney	1.00 (Reference)	0.39 (0.12, 1.25)	1.27 (0.72, 2.23)	1.75 (0.92, 3.31)	1.09 (-0.23, 2.52)	0.63 (-0.23, 1.03)
Lung	Heart	1.00 (Reference)	1.40 (0.65, 3.01)	3.13 (1.72, 5.72)	13.56 (3.02, 60.87)	10.03 (-0.64, 57.18)	0.74 (-0.46, 0.83)
Lung	Pancreas	1.00 (Reference)	1.47 (0.51, 4.20)	1.30 (0.78, 2.18)	1.72 (0.70, 4.25)	-0.05 (-3.04, 2.52)	-0.03 (-2.91, 0.55)
Lung	Muscle	1.00 (Reference)	1.42 (0.66, 3.04)	1.05 (0.52, 2.13)	1.79 (0.42, 7.51)	0.31 (-2.02, 6.02)	0.17 (-4.40, 1.09)
Lung	Adipose	1.00 (Reference)	2.53 (1.23, 5.20)	1.53 (0.81, 2.91)	0.33 (0.04, 2.50)	-2.74 (-5.92, -0.15)	-8.35 (-93.26, 2.00)
Lung	Kidney	1.00 (Reference)	1.72 (0.60, 4.88)	1.60 (0.96, 2.68)	1.92 (0.75, 4.92)	-0.40 (-3.87, 2.58)	-0.21 (-3.34, 0.40)
Heart	Pancreas	1.00 (Reference)	4.13 (1.97, 8.65)	1.32 (0.77, 2.25)	3.20 (1.40, 7.33)	-1.24 (-6.03, 3.06)	-0.39 (-2.92, 0.34)
Heart	Muscle	1.00 (Reference)	2.90 (1.53, 5.48)	0.86 (0.39, 1.89)	5.80 (2.04, 16.52)	3.04 (-1.35, 13.64)	0.52 (-0.74, 0.74)
Heart	Adipose	1.00 (Reference)	3.45 (1.77, 6.71)	0.98 (0.46, 2.08)	3.15 (1.22, 8.13)	-0.27 (-4.05, 4.73)	-0.09 (-2.51, 0.44)
Heart	Kidney	1.00 (Reference)	2.92 (1.28, 6.70)	1.49 (0.86, 2.56)	5.55 (2.53, 12.19)	2.14 (-2.29, 8.49)	0.39 (-0.69, 0.70)
Pancreas	Muscle	1.00 (Reference)	1.40 (0.84, 2.34)	1.25 (0.56, 2.79)	1.21 (0.42, 3.43)	-0.44 (-2.42, 1.80)	-0.37 (-4.34, 0.34)
Pancreas	Adipose	1.00 (Reference)	1.37 (0.81, 2.32)	1.19 (0.49, 2.91)	1.34 (0.59, 3.05)	-0.22 (-2.25, 1.49)	-0.16 (-2.64, 0.47)
Pancreas	Kidney	1.00 (Reference)	1.24 (0.62, 2.49)	1.52 (0.84, 2.77)	1.90 (0.99, 3.67)	0.14 (-1.65, 1.71)	0.07 (-1.10, 0.55)
Muscle	Adipose	1.00 (Reference)	0.93 (0.42, 2.04)	1.02 (0.50, 2.07)	1.64 (0.57, 4.72)	0.69 (-1.09, 3.74)	0.42 (-1.82, 1.03)
Muscle	Kidney	1.00 (Reference)	1.08 (0.42, 2.75)	1.58 (0.94, 2.66)	1.69 (0.68, 4.19)	0.04 (-2.11, 2.44)	0.02 (-2.24, 0.54)
Adipose	Kidney	1.00 (Reference)	1.68 (0.72, 3.92)	1.78 (1.05, 3.00)	1.32 (0.54, 3.23)	-1.14 (-3.79, 0.79)	-0.86 (-4.48, -0.01)

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

AP: attributable proportion; CI: confidence interval; HR: hazard ratio; RERI: relative excess risk due to interaction.

Table S20. Interaction Analysis: Dual-Organ Co-Aging and Chronic Kidney Disease Risk

Organ pair		Adjusted HR (95%CI)				Additive joint interaction	
Organ1	Organ2	Both young	Organ1 aged	Organ2 aged	Both aged	RERI	AP
Brain	Artery	1.00 (Reference)	1.20 (0.80, 1.79)	2.74 (1.72, 4.37)	6.27 (3.85, 10.22)	3.33 (0.51, 7.29)	0.53 (0.08, 0.73)
Brain	Liver	1.00 (Reference)	1.62 (1.11, 2.37)	2.51 (1.72, 3.66)	2.85 (1.63, 4.97)	-0.28 (-2.03, 1.91)	-0.10 (-1.15, 0.32)
Brain	Immune	1.00 (Reference)	1.41 (0.92, 2.16)	1.75 (1.26, 2.44)	3.06 (1.94, 4.83)	0.90 (-0.50, 2.66)	0.29 (-0.28, 0.55)
Brain	Intestine	1.00 (Reference)	1.54 (0.97, 2.44)	2.46 (1.83, 3.30)	3.04 (1.97, 4.69)	0.05 (-1.45, 1.72)	0.02 (-0.67, 0.36)
Brain	Lung	1.00 (Reference)	1.69 (1.19, 2.41)	2.38 (1.57, 3.60)	2.85 (1.44, 5.63)	-0.22 (-2.14, 2.60)	-0.08 (-1.42, 0.35)
Brain	Heart	1.00 (Reference)	1.38 (0.93, 2.04)	2.60 (1.77, 3.81)	4.39 (2.62, 7.35)	1.41 (-0.70, 4.38)	0.32 (-0.29, 0.58)
Brain	Pancreas	1.00 (Reference)	1.65 (1.03, 2.64)	3.14 (2.34, 4.22)	3.95 (2.55, 6.11)	0.16 (-1.62, 2.25)	0.04 (-0.58, 0.36)
Brain	Muscle	1.00 (Reference)	1.56 (1.08, 2.26)	1.97 (1.37, 2.85)	3.62 (2.00, 6.55)	1.08 (-0.79, 4.02)	0.30 (-0.45, 0.56)
Brain	Adipose	1.00 (Reference)	1.62 (1.09, 2.43)	2.51 (1.77, 3.54)	3.08 (1.85, 5.13)	-0.05 (-1.68, 1.99)	-0.02 (-0.85, 0.35)
Brain	Kidney	1.00 (Reference)	1.27 (0.76, 2.12)	1.61 (1.19, 2.18)	2.99 (1.96, 4.57)	1.11 (-0.17, 2.62)	0.37 (-0.11, 0.60)
Artery	Liver	1.00 (Reference)	4.21 (2.66, 6.64)	2.27 (1.54, 3.35)	3.85 (2.30, 6.45)	-1.63 (-4.64, 1.34)	-0.42 (-1.72, 0.16)
Artery	Immune	1.00 (Reference)	4.65 (3.00, 7.20)	1.93 (1.41, 2.64)	3.62 (2.11, 6.21)	-1.95 (-4.91, 0.98)	-0.54 (-1.95, 0.10)
Artery	Intestine	1.00 (Reference)	4.07 (2.53, 6.57)	2.42 (1.82, 3.22)	5.43 (3.32, 8.89)	-0.06 (-3.23, 3.52)	-0.01 (-0.85, 0.39)
Artery	Lung	1.00 (Reference)	3.56 (2.42, 5.22)	2.20 (1.47, 3.29)	8.88 (4.10, 19.23)	4.13 (-0.90, 14.44)	0.47 (-0.29, 0.70)
Artery	Heart	1.00 (Reference)	3.04 (1.89, 4.90)	2.37 (1.59, 3.53)	5.86 (3.65, 9.42)	1.46 (-1.48, 5.08)	0.25 (-0.38, 0.54)
Artery	Pancreas	1.00 (Reference)	3.63 (2.16, 6.09)	2.97 (2.22, 3.97)	7.44 (4.65, 11.91)	1.85 (-1.66, 6.24)	0.25 (-0.33, 0.53)
Artery	Muscle	1.00 (Reference)	3.50 (2.33, 5.27)	1.95 (1.36, 2.79)	6.07 (3.27, 11.26)	1.62 (-1.66, 6.84)	0.27 (-0.52, 0.57)
Artery	Adipose	1.00 (Reference)	4.14 (2.67, 6.40)	2.46 (1.75, 3.44)	5.05 (2.87, 8.87)	-0.54 (-3.63, 3.36)	-0.11 (-1.13, 0.34)

Artery	Kidney	1.00 (Reference)	3.76 (2.24, 6.31)	1.68 (1.25, 2.26)	5.20 (3.25, 8.34)	0.76 (-2.27, 3.99)	0.15 (-0.60, 0.50)
Liver	Immune	1.00 (Reference)	3.46 (2.29, 5.22)	2.17 (1.57, 3.00)	2.26 (1.39, 3.67)	-2.37 (-4.46, -0.59)	-1.05 (-2.66, -0.28)
Liver	Intestine	1.00 (Reference)	1.96 (1.20, 3.20)	2.22 (1.64, 3.00)	4.61 (3.03, 6.99)	1.43 (-0.50, 3.77)	0.31 (-0.17, 0.55)
Liver	Lung	1.00 (Reference)	2.74 (1.93, 3.91)	2.66 (1.77, 4.01)	2.67 (1.29, 5.54)	-1.74 (-3.94, 1.23)	-0.65 (-2.76, 0.04)
Liver	Heart	1.00 (Reference)	1.91 (1.26, 2.89)	2.35 (1.57, 3.53)	5.66 (3.53, 9.07)	2.40 (-0.02, 5.78)	0.42 (-0.05, 0.64)
Liver	Pancreas	1.00 (Reference)	1.95 (1.16, 3.28)	2.85 (2.12, 3.84)	5.22 (3.46, 7.88)	1.41 (-0.69, 3.96)	0.27 (-0.20, 0.51)
Liver	Muscle	1.00 (Reference)	2.20 (1.52, 3.19)	1.89 (1.31, 2.73)	6.43 (3.53, 11.71)	3.34 (0.31, 8.56)	0.52 (0.02, 0.70)
Liver	Adipose	1.00 (Reference)	2.36 (1.56, 3.59)	2.39 (1.68, 3.41)	4.62 (2.83, 7.55)	0.86 (-1.28, 3.72)	0.19 (-0.44, 0.48)
Liver	Kidney	1.00 (Reference)	2.55 (1.58, 4.13)	1.72 (1.27, 2.32)	3.48 (2.24, 5.41)	0.21 (-1.69, 2.15)	0.06 (-0.64, 0.41)
Immune	Intestine	1.00 (Reference)	1.82 (1.25, 2.64)	2.39 (1.74, 3.28)	4.08 (2.74, 6.08)	0.87 (-0.68, 2.77)	0.21 (-0.25, 0.47)
Immune	Lung	1.00 (Reference)	1.80 (1.32, 2.47)	2.05 (1.25, 3.36)	3.64 (2.18, 6.08)	0.79 (-1.15, 3.24)	0.22 (-0.51, 0.52)
Immune	Heart	1.00 (Reference)	1.91 (1.39, 2.62)	2.97 (2.02, 4.36)	4.44 (2.61, 7.55)	0.56 (-1.68, 3.68)	0.13 (-0.63, 0.46)
Immune	Pancreas	1.00 (Reference)	1.74 (1.15, 2.63)	2.99 (2.18, 4.09)	4.64 (3.18, 6.79)	0.92 (-0.75, 2.88)	0.20 (-0.22, 0.44)
Immune	Muscle	1.00 (Reference)	1.67 (1.21, 2.31)	1.66 (1.10, 2.53)	4.64 (2.90, 7.41)	2.31 (0.42, 5.03)	0.50 (0.08, 0.68)
Immune	Adipose	1.00 (Reference)	1.88 (1.33, 2.65)	2.48 (1.71, 3.59)	3.62 (2.31, 5.66)	0.26 (-1.39, 2.25)	0.07 (-0.55, 0.39)
Immune	Kidney	1.00 (Reference)	2.18 (1.48, 3.22)	1.88 (1.37, 2.57)	2.94 (1.94, 4.45)	-0.12 (-1.49, 1.32)	-0.04 (-0.66, 0.30)
Intestine	Lung	1.00 (Reference)	2.34 (1.75, 3.11)	1.95 (1.14, 3.34)	4.48 (2.77, 7.26)	1.20 (-0.96, 3.94)	0.27 (-0.34, 0.54)
Intestine	Heart	1.00 (Reference)	2.51 (1.87, 3.37)	3.13 (2.07, 4.71)	5.21 (3.22, 8.43)	0.58 (-1.89, 3.76)	0.11 (-0.55, 0.44)
Intestine	Pancreas	1.00 (Reference)	2.12 (1.42, 3.17)	2.82 (1.99, 3.99)	4.63 (3.32, 6.46)	0.70 (-0.97, 2.37)	0.15 (-0.25, 0.40)
Intestine	Muscle	1.00 (Reference)	2.47 (1.84, 3.31)	2.10 (1.37, 3.20)	4.06 (2.54, 6.48)	0.49 (-1.40, 2.89)	0.12 (-0.53, 0.43)
Intestine	Adipose	1.00 (Reference)	2.48 (1.82, 3.39)	2.52 (1.69, 3.75)	4.41 (2.90, 6.72)	0.41 (-1.42, 2.59)	0.09 (-0.45, 0.39)

Intestine	Kidney	1.00 (Reference)	2.43 (1.66, 3.55)	1.62 (1.15, 2.28)	3.49 (2.43, 5.01)	0.44 (-0.95, 1.85)	0.13 (-0.33, 0.40)
Lung	Heart	1.00 (Reference)	2.46 (1.67, 3.63)	3.05 (2.18, 4.27)	7.14 (2.56, 19.93)	2.63 (-2.12, 15.35)	0.37 (-0.96, 0.63)
Lung	Pancreas	1.00 (Reference)	1.73 (0.95, 3.17)	2.90 (2.17, 3.87)	5.12 (3.24, 8.07)	1.48 (-0.81, 4.36)	0.29 (-0.25, 0.54)
Lung	Muscle	1.00 (Reference)	2.07 (1.36, 3.13)	1.95 (1.37, 2.77)	6.43 (3.24, 12.76)	3.41 (0.09, 9.70)	0.53 (-0.06, 0.71)
Lung	Adipose	1.00 (Reference)	2.47 (1.56, 3.90)	2.54 (1.82, 3.55)	3.57 (2.00, 6.38)	-0.45 (-2.63, 2.37)	-0.13 (-1.20, 0.31)
Lung	Kidney	1.00 (Reference)	2.06 (1.20, 3.56)	1.71 (1.28, 2.29)	3.89 (2.37, 6.40)	1.12 (-0.89, 3.57)	0.29 (-0.36, 0.56)
Heart	Pancreas	1.00 (Reference)	2.23 (1.35, 3.69)	2.75 (2.04, 3.71)	7.61 (5.02, 11.54)	3.62 (0.90, 7.36)	0.48 (0.13, 0.65)
Heart	Muscle	1.00 (Reference)	2.85 (1.99, 4.07)	2.05 (1.43, 2.94)	6.29 (3.28, 12.07)	2.40 (-0.82, 8.12)	0.38 (-0.31, 0.63)
Heart	Adipose	1.00 (Reference)	2.42 (1.59, 3.69)	2.14 (1.50, 3.06)	5.91 (3.70, 9.46)	2.35 (-0.08, 5.79)	0.40 (-0.06, 0.61)
Heart	Kidney	1.00 (Reference)	2.59 (1.65, 4.07)	1.73 (1.28, 2.35)	6.02 (3.78, 9.59)	2.69 (0.29, 6.09)	0.45 (0.03, 0.65)
Pancreas	Muscle	1.00 (Reference)	2.94 (2.19, 3.95)	1.82 (1.14, 2.90)	6.21 (3.99, 9.67)	2.46 (0.14, 5.73)	0.40 (-0.00, 0.60)
Pancreas	Adipose	1.00 (Reference)	2.85 (2.09, 3.89)	2.10 (1.34, 3.30)	5.79 (3.88, 8.64)	1.84 (-0.15, 4.42)	0.32 (-0.06, 0.53)
Pancreas	Kidney	1.00 (Reference)	3.09 (2.15, 4.45)	1.65 (1.14, 2.40)	4.57 (3.16, 6.62)	0.83 (-0.76, 2.57)	0.18 (-0.21, 0.42)
Muscle	Adipose	1.00 (Reference)	2.03 (1.38, 3.00)	2.45 (1.74, 3.44)	4.09 (2.38, 7.04)	0.62 (-1.38, 3.50)	0.15 (-0.58, 0.46)
Muscle	Kidney	1.00 (Reference)	1.55 (0.95, 2.52)	1.60 (1.18, 2.16)	4.37 (2.83, 6.76)	2.22 (0.55, 4.49)	0.51 (0.13, 0.69)
Adipose	Kidney	1.00 (Reference)	3.00 (1.98, 4.55)	1.88 (1.37, 2.57)	3.41 (2.22, 5.23)	-0.47 (-2.25, 1.29)	-0.14 (-0.84, 0.24)

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

AP: attributable proportion; CI: confidence interval; HR: hazard ratio; RERI: relative excess risk due to interaction.

Table S21. Interaction Analysis: Dual-Organ Co-Aging and All-Cause Mortality Risk

Organ pair		Adjusted HR (95%CI)				Additive joint interaction	
Organ1	Organ2	Both young	Organ1 aged	Organ2 aged	Both aged	RERI	AP
Brain	Artery	1.00 (Reference)	1.64 (1.21, 2.22)	1.41 (0.84, 2.39)	4.28 (2.71, 6.76)	2.23 (0.38, 4.73)	0.52 (0.08, 0.71)
Brain	Liver	1.00 (Reference)	1.93 (1.43, 2.60)	1.44 (0.98, 2.10)	2.47 (1.49, 4.09)	0.11 (-1.19, 1.78)	0.04 (-0.79, 0.38)
Brain	Immune	1.00 (Reference)	2.04 (1.49, 2.78)	1.08 (0.78, 1.49)	1.88 (1.21, 2.92)	-0.23 (-1.26, 0.90)	-0.12 (-0.96, 0.26)
Brain	Intestine	1.00 (Reference)	1.88 (1.34, 2.65)	1.29 (0.96, 1.73)	2.37 (1.62, 3.45)	0.19 (-0.88, 1.34)	0.08 (-0.51, 0.39)
Brain	Lung	1.00 (Reference)	1.83 (1.36, 2.46)	1.60 (1.08, 2.37)	3.44 (2.10, 5.64)	1.02 (-0.56, 3.22)	0.30 (-0.30, 0.55)
Brain	Heart	1.00 (Reference)	1.72 (1.27, 2.34)	1.73 (1.18, 2.53)	3.71 (2.36, 5.82)	1.26 (-0.33, 3.38)	0.34 (-0.18, 0.57)
Brain	Pancreas	1.00 (Reference)	1.74 (1.21, 2.49)	1.49 (1.13, 1.97)	3.02 (2.08, 4.37)	0.79 (-0.36, 2.12)	0.26 (-0.18, 0.50)
Brain	Muscle	1.00 (Reference)	1.82 (1.35, 2.44)	1.14 (0.78, 1.66)	2.93 (1.78, 4.83)	0.98 (-0.36, 2.88)	0.33 (-0.26, 0.57)
Brain	Adipose	1.00 (Reference)	2.24 (1.67, 3.02)	1.22 (0.85, 1.75)	1.49 (0.88, 2.51)	-0.97 (-2.05, 0.18)	-0.65 (-2.12, -0.08)
Brain	Kidney	1.00 (Reference)	1.94 (1.34, 2.80)	1.28 (0.98, 1.69)	2.40 (1.65, 3.50)	0.18 (-0.91, 1.31)	0.08 (-0.50, 0.38)
Artery	Liver	1.00 (Reference)	2.60 (1.67, 4.05)	1.53 (1.07, 2.21)	1.86 (1.07, 3.23)	-1.28 (-3.04, 0.39)	-0.69 (-2.43, -0.00)
Artery	Immune	1.00 (Reference)	2.37 (1.52, 3.69)	1.07 (0.79, 1.44)	1.93 (1.12, 3.33)	-0.51 (-2.06, 1.09)	-0.26 (-1.61, 0.26)
Artery	Intestine	1.00 (Reference)	1.96 (1.20, 3.18)	1.31 (1.01, 1.72)	2.76 (1.69, 4.50)	0.49 (-1.12, 2.32)	0.18 (-0.62, 0.51)
Artery	Lung	1.00 (Reference)	1.70 (1.11, 2.60)	1.51 (1.05, 2.17)	5.93 (3.29, 10.68)	3.72 (0.93, 8.46)	0.63 (0.20, 0.77)
Artery	Heart	1.00 (Reference)	2.57 (1.65, 4.00)	2.23 (1.58, 3.14)	2.06 (1.19, 3.55)	-1.74 (-3.63, 0.05)	-0.85 (-2.62, -0.12)
Artery	Pancreas	1.00 (Reference)	1.80 (1.04, 3.12)	1.51 (1.16, 1.96)	3.04 (1.94, 4.78)	0.73 (-0.95, 2.55)	0.24 (-0.45, 0.54)
Artery	Muscle	1.00 (Reference)	2.18 (1.46, 3.27)	1.27 (0.91, 1.79)	2.29 (1.17, 4.48)	-0.16 (-1.77, 2.11)	-0.07 (-1.47, 0.34)
Artery	Adipose	1.00 (Reference)	2.49 (1.64, 3.78)	1.14 (0.81, 1.60)	1.72 (0.92, 3.22)	-0.91 (-2.46, 0.77)	-0.53 (-2.37, 0.08)

Artery	Kidney	1.00 (Reference)	2.50 (1.51, 4.14)	1.33 (1.03, 1.73)	2.32 (1.42, 3.77)	-0.51 (-2.35, 1.15)	-0.22 (-1.38, 0.28)
Liver	Immune	1.00 (Reference)	1.58 (1.04, 2.40)	1.04 (0.75, 1.44)	1.51 (0.98, 2.34)	-0.11 (-1.13, 0.86)	-0.07 (-1.02, 0.35)
Liver	Intestine	1.00 (Reference)	1.46 (0.95, 2.24)	1.35 (1.02, 1.78)	1.89 (1.23, 2.92)	0.09 (-0.97, 1.20)	0.05 (-0.73, 0.39)
Liver	Lung	1.00 (Reference)	1.65 (1.17, 2.34)	1.98 (1.40, 2.81)	1.72 (0.87, 3.40)	-0.92 (-2.26, 0.85)	-0.54 (-2.47, 0.03)
Liver	Heart	1.00 (Reference)	1.60 (1.11, 2.32)	2.28 (1.62, 3.22)	1.92 (1.11, 3.32)	-0.97 (-2.36, 0.58)	-0.50 (-1.93, 0.06)
Liver	Pancreas	1.00 (Reference)	1.35 (0.85, 2.16)	1.56 (1.19, 2.03)	2.16 (1.43, 3.26)	0.25 (-0.85, 1.40)	0.12 (-0.55, 0.43)
Liver	Muscle	1.00 (Reference)	1.63 (1.16, 2.29)	1.39 (1.00, 1.94)	1.45 (0.68, 3.09)	-0.57 (-1.71, 1.14)	-0.39 (-2.53, 0.06)
Liver	Adipose	1.00 (Reference)	1.43 (0.96, 2.11)	1.02 (0.71, 1.49)	1.78 (1.09, 2.90)	0.32 (-0.69, 1.50)	0.18 (-0.62, 0.50)
Liver	Kidney	1.00 (Reference)	1.56 (0.98, 2.49)	1.32 (1.02, 1.72)	1.85 (1.21, 2.82)	-0.03 (-1.15, 1.02)	-0.02 (-0.83, 0.36)
Immune	Intestine	1.00 (Reference)	1.13 (0.80, 1.59)	1.45 (1.09, 1.93)	1.42 (0.94, 2.15)	-0.16 (-0.93, 0.64)	-0.11 (-0.92, 0.26)
Immune	Lung	1.00 (Reference)	1.11 (0.82, 1.51)	1.97 (1.34, 2.88)	1.64 (0.97, 2.77)	-0.44 (-1.60, 0.81)	-0.27 (-1.50, 0.20)
Immune	Heart	1.00 (Reference)	1.09 (0.80, 1.48)	2.12 (1.49, 3.01)	2.02 (1.19, 3.43)	-0.19 (-1.42, 1.31)	-0.09 (-1.13, 0.31)
Immune	Pancreas	1.00 (Reference)	1.15 (0.80, 1.66)	1.72 (1.31, 2.26)	1.55 (1.05, 2.29)	-0.32 (-1.15, 0.48)	-0.21 (-0.96, 0.18)
Immune	Muscle	1.00 (Reference)	1.08 (0.80, 1.46)	1.26 (0.88, 1.82)	1.57 (0.91, 2.72)	0.23 (-0.68, 1.42)	0.14 (-0.80, 0.45)
Immune	Adipose	1.00 (Reference)	1.13 (0.83, 1.55)	1.17 (0.81, 1.69)	1.19 (0.72, 1.96)	-0.12 (-0.89, 0.72)	-0.10 (-1.17, 0.30)
Immune	Kidney	1.00 (Reference)	0.96 (0.64, 1.44)	1.28 (0.97, 1.68)	1.56 (1.07, 2.27)	0.32 (-0.38, 1.03)	0.20 (-0.34, 0.49)
Intestine	Lung	1.00 (Reference)	1.40 (1.07, 1.84)	1.95 (1.29, 2.95)	1.97 (1.24, 3.15)	-0.38 (-1.64, 0.92)	-0.19 (-1.19, 0.25)
Intestine	Heart	1.00 (Reference)	1.35 (1.03, 1.78)	1.97 (1.36, 2.85)	2.83 (1.76, 4.56)	0.51 (-0.86, 2.27)	0.18 (-0.50, 0.47)
Intestine	Pancreas	1.00 (Reference)	1.26 (0.88, 1.81)	1.55 (1.14, 2.11)	1.90 (1.38, 2.60)	0.09 (-0.75, 0.84)	0.04 (-0.47, 0.35)
Intestine	Muscle	1.00 (Reference)	1.48 (1.13, 1.93)	1.45 (0.99, 2.12)	1.46 (0.88, 2.41)	-0.47 (-1.44, 0.58)	-0.32 (-1.50, 0.14)
Intestine	Adipose	1.00 (Reference)	1.51 (1.14, 1.99)	1.24 (0.84, 1.84)	1.30 (0.83, 2.05)	-0.45 (-1.30, 0.39)	-0.34 (-1.40, 0.11)

Intestine	Kidney	1.00 (Reference)	1.57 (1.11, 2.23)	1.39 (1.05, 1.86)	1.62 (1.15, 2.29)	-0.34 (-1.19, 0.39)	-0.21 (-0.87, 0.17)
Lung	Heart	1.00 (Reference)	1.78 (1.26, 2.51)	2.02 (1.46, 2.79)	5.03 (2.31, 10.98)	2.23 (-0.61, 8.15)	0.44 (-0.39, 0.64)
Lung	Pancreas	1.00 (Reference)	2.01 (1.30, 3.10)	1.63 (1.26, 2.12)	2.15 (1.37, 3.36)	-0.49 (-1.85, 0.85)	-0.23 (-1.18, 0.21)
Lung	Muscle	1.00 (Reference)	1.78 (1.26, 2.52)	1.30 (0.92, 1.81)	2.43 (1.19, 4.96)	0.35 (-1.13, 2.90)	0.15 (-1.06, 0.44)
Lung	Adipose	1.00 (Reference)	2.16 (1.50, 3.09)	1.22 (0.87, 1.72)	1.29 (0.69, 2.42)	-1.09 (-2.28, 0.20)	-0.84 (-2.98, -0.17)
Lung	Kidney	1.00 (Reference)	1.64 (1.03, 2.62)	1.29 (0.99, 1.67)	2.39 (1.55, 3.69)	0.46 (-0.78, 1.80)	0.19 (-0.47, 0.50)
Heart	Pancreas	1.00 (Reference)	1.66 (1.07, 2.57)	1.46 (1.11, 1.91)	3.25 (2.18, 4.83)	1.13 (-0.22, 2.72)	0.35 (-0.12, 0.58)
Heart	Muscle	1.00 (Reference)	2.07 (1.49, 2.87)	1.31 (0.93, 1.84)	2.53 (1.29, 4.96)	0.16 (-1.36, 2.62)	0.06 (-1.12, 0.40)
Heart	Adipose	1.00 (Reference)	2.10 (1.47, 3.00)	1.05 (0.73, 1.51)	2.02 (1.21, 3.37)	-0.13 (-1.36, 1.31)	-0.06 (-1.05, 0.33)
Heart	Kidney	1.00 (Reference)	2.06 (1.38, 3.08)	1.35 (1.04, 1.76)	2.78 (1.76, 4.37)	0.37 (-0.99, 1.96)	0.13 (-0.53, 0.44)
Pancreas	Muscle	1.00 (Reference)	1.67 (1.29, 2.17)	1.39 (0.93, 2.08)	1.84 (1.14, 2.95)	-0.23 (-1.26, 0.93)	-0.12 (-1.03, 0.26)
Pancreas	Adipose	1.00 (Reference)	1.66 (1.27, 2.16)	1.09 (0.70, 1.70)	1.63 (1.08, 2.47)	-0.12 (-0.99, 0.76)	-0.07 (-0.82, 0.28)
Pancreas	Kidney	1.00 (Reference)	1.78 (1.28, 2.47)	1.39 (1.02, 1.88)	1.91 (1.36, 2.67)	-0.26 (-1.13, 0.51)	-0.14 (-0.68, 0.20)
Muscle	Adipose	1.00 (Reference)	1.39 (0.98, 1.98)	1.18 (0.84, 1.66)	1.23 (0.66, 2.30)	-0.34 (-1.25, 0.79)	-0.27 (-1.85, 0.16)
Muscle	Kidney	1.00 (Reference)	1.04 (0.65, 1.65)	1.26 (0.96, 1.64)	2.02 (1.33, 3.08)	0.73 (-0.17, 1.78)	0.36 (-0.17, 0.60)
Adipose	Kidney	1.00 (Reference)	1.30 (0.84, 2.01)	1.41 (1.08, 1.84)	1.34 (0.87, 2.07)	-0.37 (-1.25, 0.42)	-0.27 (-1.21, 0.16)

HRs have been adjusted for age, sex, ethnicity, Townsend deprivation index, smoking status, antihypertensive/antidiabetic medication use, systolic blood pressure, body mass index, total cholesterol, and glucose levels.

AP: attributable proportion; CI: confidence interval; HR: hazard ratio; RERI: relative excess risk due to interaction.