Figure 1

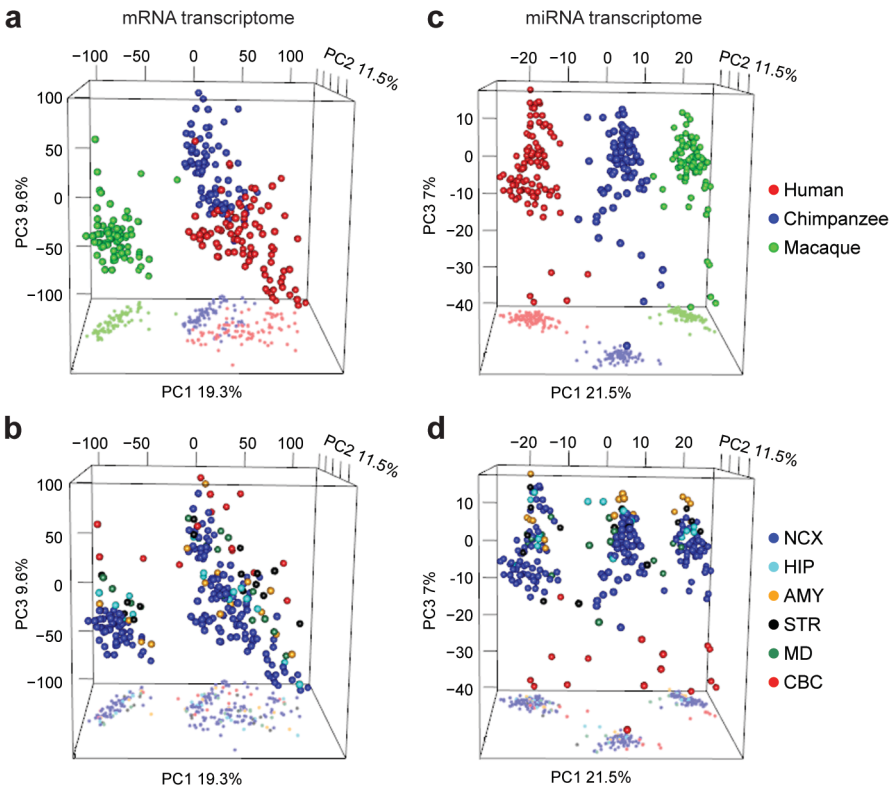

a
mRNA transcriptome
PC2 11.5%
PC3 9.6%
PC1 19.3%
b
c
miRNA transcriptome
PC3 7%
PC1 21.5%
d
Human
Chimpanzee
Macaque
NCX
HIP
AMY
STR
MD
CBC

Figure 2

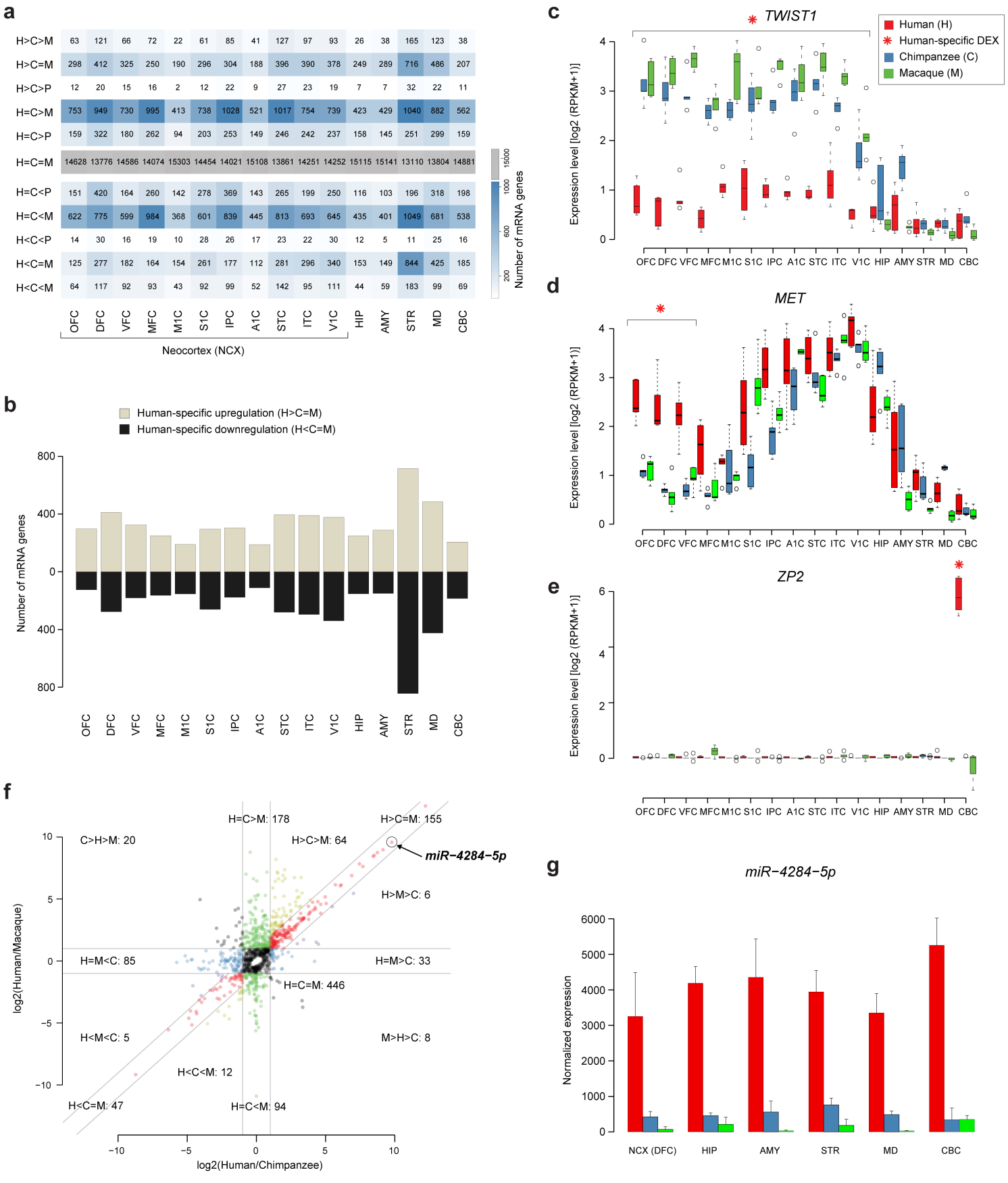

a
H>C>M 63 121 66 72 22 61 85 41 127 97 93 26 38 165 123 38
H>C=M 298 412 325 250 190 296 304 188 396 390 378 249 289 716 486 207
H>C>P 12 20 15 16 2 12 22 9 27 23 19 7 7 32 22 11
H=C>M 753 949 730 995 413 738 1028 521 1017 754 739 423 429 1040 882 562
H=C>P 159 322 180 262 94 203 253 149 246 242 237 158 145 251 299 159
H=C=M 14628 13776 14586 14074 15303 14454 14021 15108 13861 14251 14252 15115 15141 13110 13804 14881
H=C<P 151 420 164 260 142 278 369 143 265 199 250 116 103 196 318 198
H=C<M 622 775 599 984 368 601 839 445 813 693 645 435 401 1049 681 538
H<C<P 14 30 16 19 10 28 26 17 23 22 30 12 5 11 25 16
H<C=M 125 277 182 164 154 261 177 112 281 296 340 153 149 844 425 185
H<C<M 64 117 92 93 43 92 99 52 142 95 111 44 59 183 99 69
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
Neocortex (NCX)
Number of mRNA genes
15000 1000 600 200
b
Human-specific upregulation (H>C=M)
Human-specific downregulation (H<C=M)
Number of mRNA genes
800 400 0 400 800
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
c
TWIST1
Human (H)
Human-specific DEX
Chimpanzee (C)
Macaque (M)
Expression level [log2 (RPKM+1)]
0 1 2 3 4
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
d
MET
Expression level [log2 (RPKM+1)]
0 1 2 3 4
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
e
ZP2
Expression level [log2 (RPKM+1)]
0 2 4 6
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
f
H=C>M: 178
H>C=M: 155
C>H>M: 20
H>C>M: 64
miR−4284−5p
H>M>C: 6
H=M<C: 85
H=M>C: 33
H=C=M: 446
H>M<C: 5
M>H>C: 8
H<C<M: 12
H<C=M: 47
H=C<M: 94
log2(Human/Macaque)
10 5 0 −5 −10
−10 −5 0 5 10
log2(Human/Chimpanzee)
g
miR−4284−5p
Normalized expression
0 1000 2000 3000 4000 5000 6000
NCX (DFC) HIP AMY STR MD CBC

Figure 3

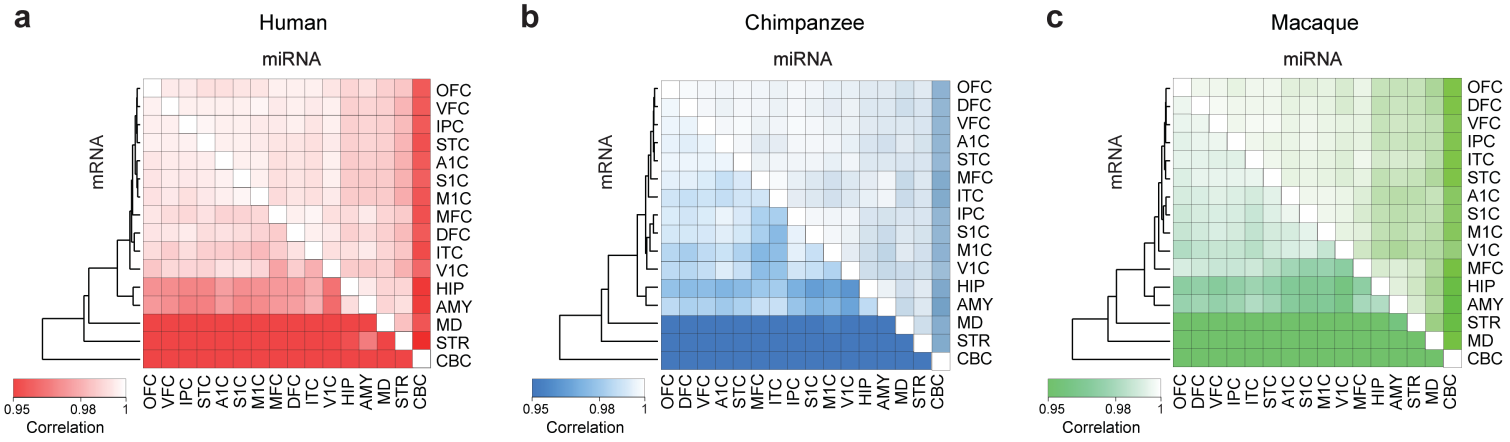

a
Human
miRNA
mRNA
OFC
VFC
IPC
STC
A1C
S1C
M1C
MFC
DFC
ITC
V1C
HIP
AMY
MD
STR
CBC
0.95
0.98
1
Correlation
b
Chimpanzee
miRNA
mRNA
OFC
DFC
VFC
A1C
STC
MFC
ITC
IPC
S1C
M1C
V1C
HIP
AMY
MD
STR
CBC
0.95
0.98
1
Correlation
c
Macaque
miRNA
mRNA
OFC
DFC
VFC
IPC
ITC
STC
A1C
S1C
M1C
V1C
MFC
HIP
AMY
STR
MD
CBC
0.95
0.98
1
Correlation

Figure 4

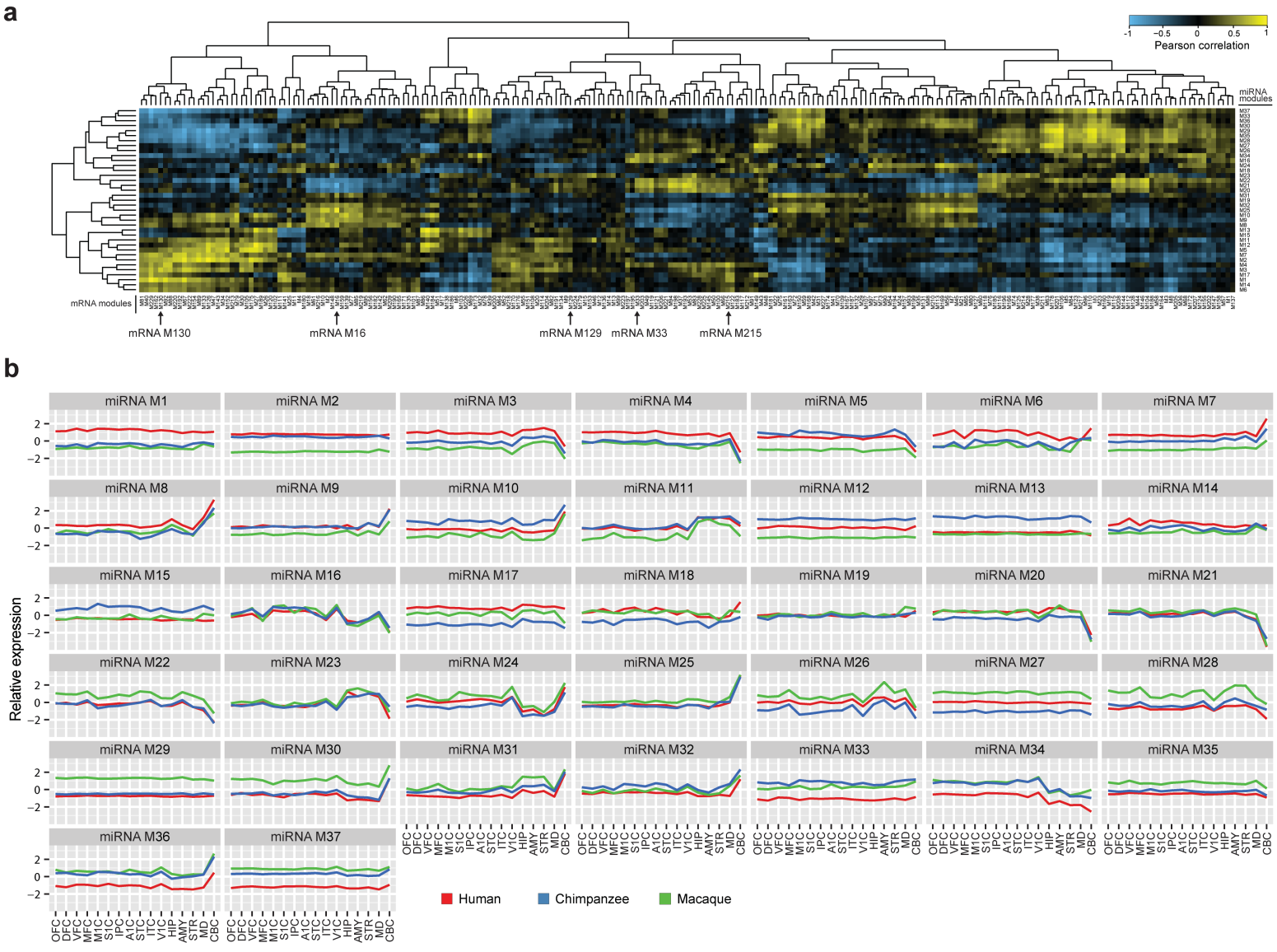

a
Pearson correlation
−1
−0.5
0
0.5
1
miRNA modules
mRNA modules
mRNA M130
mRNA M16
mRNA M129
mRNA M33
mRNA M215
b
Relative expression
miRNA M1
miRNA M2
miRNA M3
miRNA M4
miRNA M5
miRNA M6
miRNA M7
miRNA M8
miRNA M9
miRNA M10
miRNA M11
miRNA M12
miRNA M13
miRNA M14
miRNA M15
miRNA M16
miRNA M17
miRNA M18
miRNA M19
miRNA M20
miRNA M21
miRNA M22
miRNA M23
miRNA M24
miRNA M25
miRNA M26
miRNA M27
miRNA M28
miRNA M29
miRNA M30
miRNA M31
miRNA M32
miRNA M33
miRNA M34
miRNA M35
miRNA M36
miRNA M37
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
Human
Chimpanzee
Macaque

Figure 5

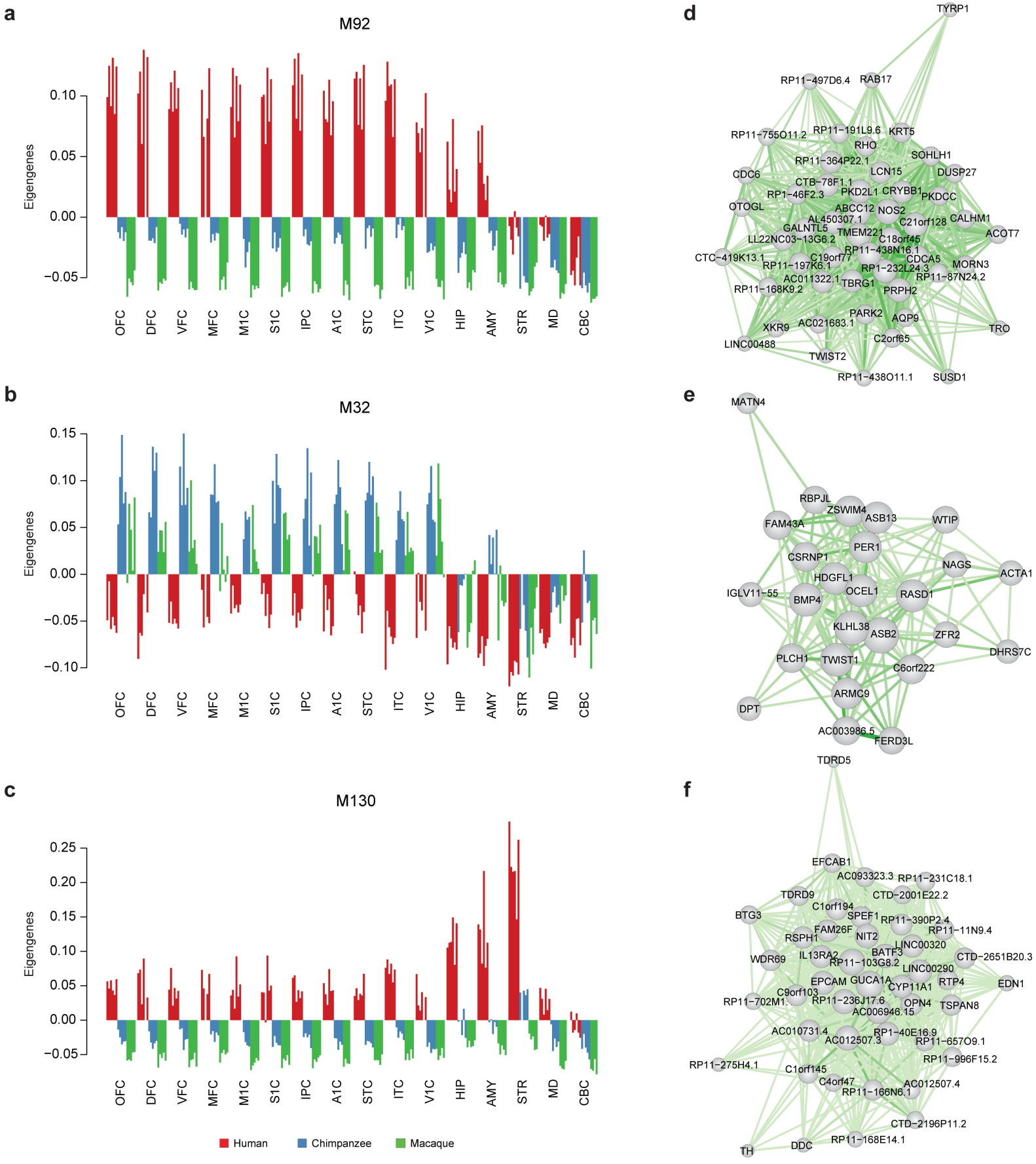

a
M92
Eigengenes
0.10
0.05
0.00
−0.05
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
b
M32
Eigengenes
0.15
0.10
0.05
0.00
−0.05
−0.10
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
c
M130
Eigengenes
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
Human
Chimpanzee
Macaque
d
TYRP1
RP11−497D6.4
RAB17
RP11−755O11.2
RP11−191L9.6
KRT5
RHO
SOHLH1
RP11−364P22.1
CDC6
LCN15
DUSP27
CTB−78F1.1
RP1−46F2.3
PKD2L1
CRYBB1
PKDCC
OTOGL
ABCC12
NOS2
AL450307.1
C21orf128
CALHM1
GALNTL5
TMEM221
ACOT7
LL22NC03−13G6.2
C18orf45
CTC−419K13.1
RP11−438N16.1
C19orf77
CDCA5
RP11−197K6.1
RP1−232L24.3
MORN3
AC011322.1
TBRG1
RP11−87N24.2
RP11−168K9.2
PRPH2
PARK2
AQP9
XKR9
AC021683.1
TRO
C2orf65
LINC00488
TWIST2
RP11−438O11.1
SUSD1
e
MATN4
RBPJL
ZSWIM4
ASB13
WTIP
FAM43A
PER1
CSRNP1
NAGS
ACTA1
HDGFL1
IGLV1−55
OCEL1
RASD1
BMP4
KLHL38
ASB2
ZFR2
DHRS7C
PLCH1
TWIST1
C6orf222
ARMC9
DPT
AC003986.5
FERD3L
TDRD5
f
EFCAB1
AC093323.3
RP11−231C18.1
TDRD9
CTD−2001E22.2
C1orf194
BTG3
SPEF1
RP11−390P2.4
FAM26F
RP11−11N9.4
RSPH1
NIT2
LINC00320
BATF3
WDR69
IL13RA2
CTD−2651B20.3
RP11−103G8.2
LINC00290
EPCAM
GUCA1A
CYP11A1
RTP4
EDN1
C9orf103
RP11−702M1.
RP11−236J17.6
OPN4
TSPAN8
AC006946.15
AC010731.4
RP1−40E16.9
AC012507.3
RP11−657O9.1
RP11−996F15.2
RP11−275H4.1
C1orf145
C4orf47
AC012507.4
RP11−166N6.1
CTD−2196P11.2
RP11−168E14.1
TH
DDC

Figure 6

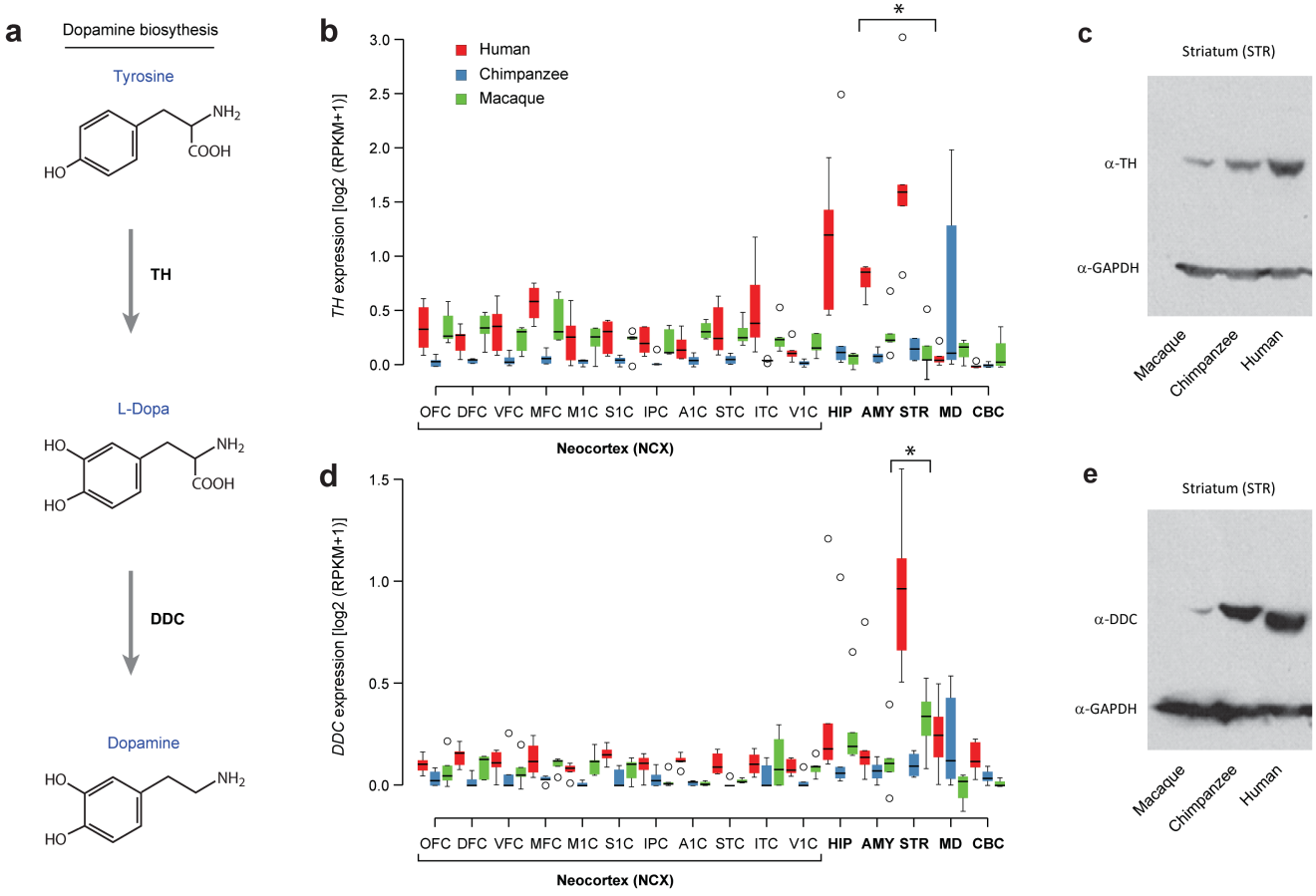
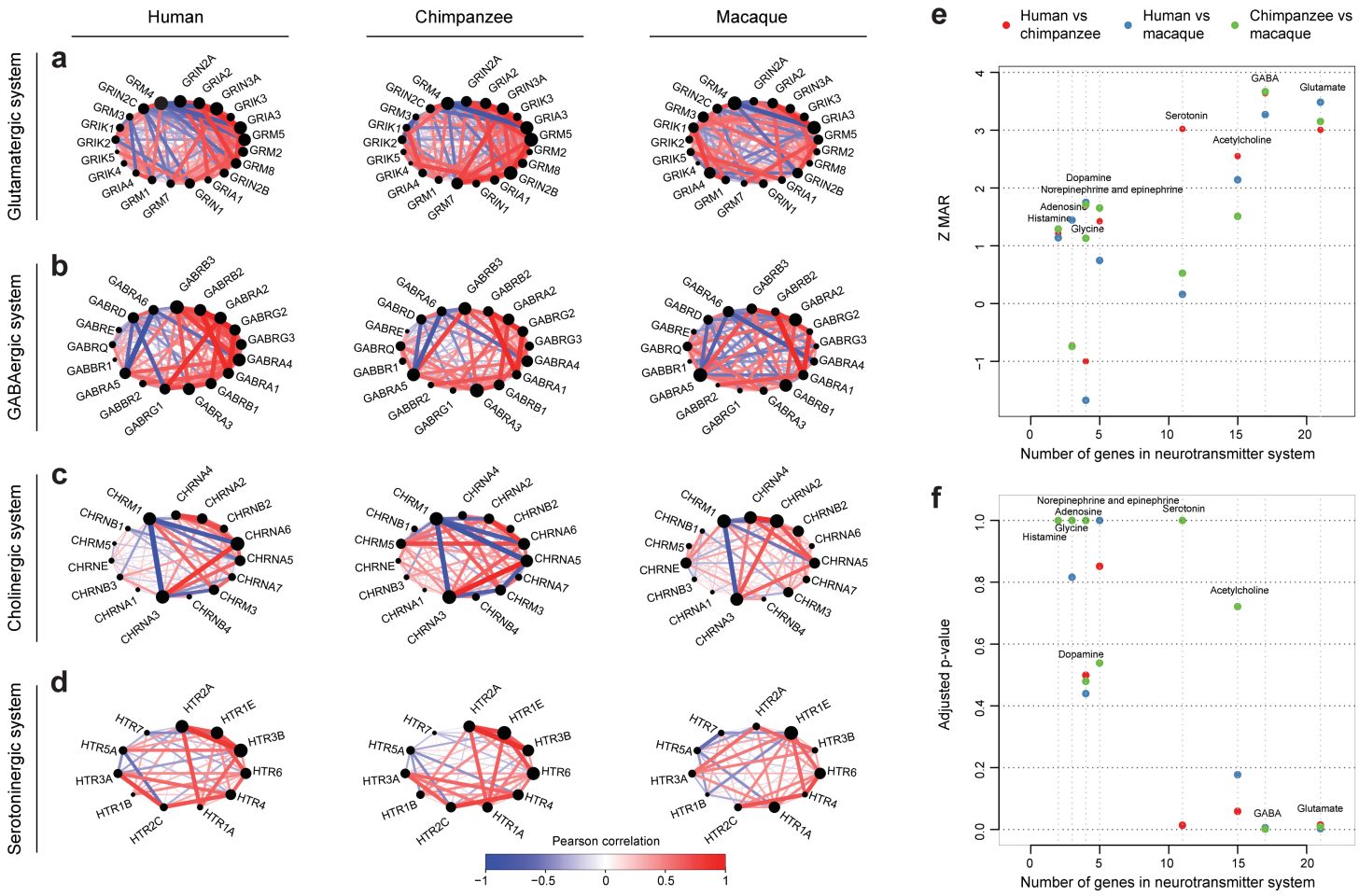

a
Dopamine biosythesis
Tyrosine
NH2
COOH
HO
TH
L-Dopa
HO
HO
NH2
COOH
DDC
Dopamine
HO
HO
NH2
b
Human
Chimpanzee
Macaque
TH expression [log2 (RPKM+1)]
3.0
2.5
2.0
1.5
1.0
0.5
0.0
*
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
Neocortex (NCX)
c
Striatum (STR)
α-TH
α-GAPDH
Macaque
Chimpanzee
Human
d
DDC expression [log2 (RPKM+1)]
1.5
1.0
0.5
0.0
*
OFC DFC VFC MFC M1C S1C IPC A1C STC ITC V1C HIP AMY STR MD CBC
Neocortex (NCX)
e
Striatum (STR)
α-DDC
α-GAPDH
Macaque
Chimpanzee
Human

Figure 7


Human
Chimpanzee
Macaque
a
Glutamatergic system
GRM4
GRIN2A
GRIA2
GRIN3A
GRIN2C
GRIK3
GRM3
GRIA3
GRIK1
GRM5
GRIK2
GRM2
GRIK5
GRM8
GRIK4
GRIN2B
GRIA4
GRIA1
GRM1
GRM7
GRIN1
b
GABAergic system
GABRB3
GABRA6
GABRB2
GABRD
GABRA2
GABRE
GABRG2
GABRQ
GABRG3
GABBR1
GABRA4
GABRA5
GABRA1
GABBR2
GABRB1
GABRG1
GABRA3
c
Cholinergic system
CHRNA4
CHRM1
CHRNA2
CHRNB2
CHRNB1
CHRNA6
CHRM5
CHRNA5
CHRNE
CHRNA7
CHRNB3
CHRM3
CHRNA1
CHRNB4
CHRNA3
d
Serotoninergic system
HTR2A
HTR7
HTR1E
HTR5A
HTR3B
HTR3A
HTR6
HTR1B
HTR4
HTR2C
HTR1A
Pearson correlation
−1
−0.5
0
0.5
1
e
Human vs chimpanzee
Human vs macaque
Chimpanzee vs macaque
Z MAR
GABA
Glutamate
Serotonin
Acetylcholine
Dopamine
Norepinephrine and epinephrine
Adenosine
Histamine
Glycine
Number of genes in neurotransmitter system
f
Adjusted p-value
Norepinephrine and epinephrine
Adenosine
Serotonin
Glycine
Histamine
Acetylcholine
Dopamine
GABA
Glutamate
Number of genes in neurotransmitter system