

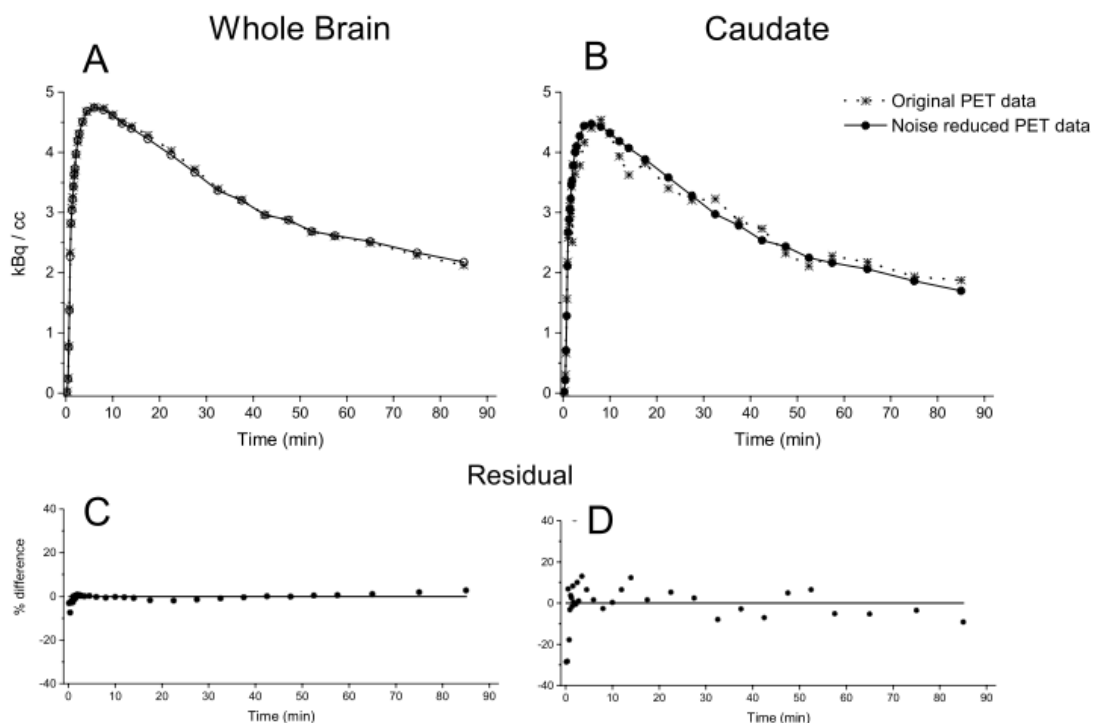
<b>Gene ID</b>	<b>Gene name</b>	<b>Probe ID</b>	<b>Pearson r: TSPO probe 1</b>	<b>Pearson r: TSPO probe 2</b>	<b>Pearson r: TSPO probe 3</b>
<b>FLT1</b>	fms-related tyrosine kinase 1	1056926	0.532	0.596	0.709
<b>FLT1</b>	fms-related tyrosine kinase 1	1020662	0.591	0.669	0.709
<b>FLT1</b>	fms-related tyrosine kinase 1	1018101	0.506	0.606	0.615
<b>FLT1</b>	fms-related tyrosine kinase 1	1020740	0.630	0.716	0.749
<b>FLT1</b>	fms-related tyrosine kinase 1	1015413	0.267	0.406	0.665
<b>FLT1</b>	fms-related tyrosine kinase 1	1015300	0.640	0.711	0.666
<b>PECAM1</b>	platelet/endothelial cell adhesion molecule 1	1053207	0.712	0.740	0.819
<b>PECAM1</b>	platelet/endothelial cell adhesion molecule 1	1053206	0.418	0.495	0.776
<b>VEZF1</b>	vascular endothelial zinc finger 1	1050180	0.929	0.941	0.735
<b>VEZF1</b>	vascular endothelial zinc finger 1	1050178	0.940	0.914	0.583
<b>VEZF1</b>	vascular endothelial zinc finger 1	1050179	0.906	0.883	0.556

<b>FOXQ1</b>	forkhead box Q1	1036406	0.795	0.774	0.811
<b>FOXQ1</b>	forkhead box Q1	1036405	0.582	0.651	0.701
<b>TSPO</b>	Translocator protein	1027316	N/A	N/A	N/A
<b>TSPO</b>	Translocator protein	1058719	N/A	N/A	N/A
<b>TSPO</b>	Translocator protein	1027317	N/A	N/A	N/A

**Supplemental Table 1:** details of mRNA probes for genes expressed in endothelial cells and TSPO within the brain. The regional correlation coefficient values of TSPO mRNA expression with all endothelial expression mRNA values are also shown. *VEZF1* is a zinc finger-containing transcription factor that is specifically expressed within the endothelium during vascular development (1). *FOXQ1* is the Forkhead box protein, which is one of the most enriched genes found in CNS endothelial cells (2). *PECAM1* is a protein found specifically on endothelial cells and platelets. *FLT1* is the gene that encodes for the vascular endothelial growth factor receptor.

1. Aitsebaomo J, Wennerberg K, Der CJ, et al. p68RacGAP is a novel GTPase-activating protein that interacts with vascular endothelial zinc finger-1 and modulates endothelial cell capillary formation. *J. Biol. Chem.* 2004 279(17):17963-72
2. Daneman R, Zhou L, Agalliu D, Cahoy JD, Kaushal A, Barres BA. The mouse blood-brain barrier transcriptome: a new resource for understanding the development and function of brain endothelial cells. *PLoS One.* 2010. 5(10):e13741

## Noise removal assessment



**Supplemental Figure 1:** TACs from the whole brain (a) and the caudate (b) from one representative  $^{18}\text{F}$ -DPA-714 scan, before (stars) and after (solid circles) the noise removal using principal component analysis. The residuals shown in the plot below each TAC are the difference between the original and noise-reduced TACs. The AIC for the fitting of the 2TC1K model to all the whole brain TACs before noise reduction was  $-54.4 \pm 28$  (as in A) and after,  $-54.2 \pm 28$  (difference not significant,  $p=0.9$ ). For the smaller region, the caudate, the AIC from the 2TC1K fitting was  $32.5 \pm 14.8$  (as in B) before noise reduction and reduced to  $-49.5 \pm 30$  afterwards, and this difference between the two groups was significant ( $p=5e-6$ ).

**Kinetic parameter estimates:**

***Supplemental Table 2: 2TC HAB parameters***

HAB	Mean (SD)			
2TCM	vB	V <sub>T</sub>	V <sub>ND</sub>	BP <sub>ND</sub> (k <sub>3</sub> /k <sub>4</sub> )
Whole brain	0.07 (0.03)	4.14 (1.83)	1.73 (0.91)	1.56 (0.71)
Temporal cortex	0.06 (0.03)	3.82 (1.58)	1.45 (0.48)	1.67 (0.68)
Parietal cortex	0.06 (0.03)	4.21 (1.93)	1.86 (0.99)	1.42 (0.68)
Occipital cortex	0.07 (0.03)	4.04 (1.77)	1.61 (0.59)	1.55 (0.65)
Frontal cortex	0.06 (0.03)	4.49 (2.10)	2.02 (1.10)	1.40 (0.69)
Thalamus	0.09 (0.04)	5.97 (2.65)	2.43 (1.31)	1.62 (0.67)
Caudate	0.06 (0.04)	3.53 (1.65)	1.55 (0.88)	1.44 (0.63)
Putamen	0.07 (0.03)	4.43 (2.12)	1.79 (0.85)	1.56 (0.73)
Hippocampus	0.08 (0.02)	4.56 (1.92)	1.70 (0.90)	1.91 (0.89)
White matter	0.07 (0.02)	4.18 (1.78)	1.57 (0.80)	1.81 (0.66)
Cerebellar cortex	0.07 (0.03)	3.97 (2.00)	1.47 (0.54)	1.65 (0.59)
Cerebellar white matter	0.07 (0.02)	4.03 (1.93)	1.47 (0.55)	1.73 (0.54)

**Supplemental Table 3: 2TC1K HAB parameters**

HAB	Mean (SD)				
2TCM-1K	vB	V <sub>T</sub>	V <sub>ND</sub>	BP <sub>ND</sub> (k <sub>3</sub> /k <sub>4</sub> )	K <sub>b</sub>
Whole brain	0.07 (0.03)	3.17 (1.61)	1.10 (0.45)	1.90 (0.74)	0.15 (0.08)
Temporal cortex	0.06 (0.03)	3.26 (1.69)	1.21 (0.63)	2.01 (1.34)	0.10 (0.06)
Parietal cortex	0.06 (0.03)	3.66 (1.98)	1.48 (0.81)	1.64 (0.78)	0.10 (0.06)
Occipital cortex	0.07 (0.03)	3.68 (1.88)	1.45 (0.73)	1.65 (0.75)	0.06 (0.04)
Frontal cortex	0.06 (0.03)	3.87 (2.10)	1.61 (0.92)	1.58 (0.73)	0.13 (0.08)
Thalamus	0.09 (0.03)	4.02 (1.98)	1.48 (0.74)	1.84 (0.88)	0.21 (0.11)
Caudate	0.06 (0.03)	3.16 (1.75)	1.27 (0.76)	1.78 (1.08)	0.07 (0.04)
Putamen	0.07 (0.03)	3.92 (2.10)	1.46 (0.80)	1.97 (1.18)	0.08 (0.04)
Hippocampus	0.08 (0.02)	3.07 (1.61)	1.00 (0.48)	2.19 (1.09)	0.17 (0.07)
White matter	0.06 (0.02)	2.65 (1.19)	0.91 (0.35)	1.96 (0.98)	0.20 (0.11)
Cerebellar cortex	0.07 (0.03)	3.68 (2.00)	1.35 (0.65)	1.74 (0.61)	0.05 (0.04)
Cerebellar white matter	0.07 (0.02)	3.04 (1.42)	1.05 (0.39)	1.90 (0.87)	0.14 (0.13)
Pallidum	0.07 (0.02)	3.11 (1.62)	1.07 (0.52)	2.02 (0.92)	0.24 (0.13)

**Supplemental Table 4: 2TC MAB parameters**

<b>MAB</b>	<b>Mean (SD)</b>	<b>Mean</b>	<b>Mean</b>	<b>Mean</b>
<b>2TCM</b>	<b>vB</b>	<b>V<sub>T</sub></b>	<b>V<sub>ND</sub></b>	<b>BP<sub>ND</sub> (k<sub>3</sub>/k<sub>4</sub>)</b>
<b>Whole brain</b>	0.07 (0.01)	2.49 (0.72)	1.33 (0.50)	0.96 (0.29)
<b>Temporal cortex</b>	0.07 (0.01)	2.35 (0.67)	1.29 (0.47)	0.90 (0.32)
<b>Parietal cortex</b>	0.07 (0.01)	2.59 (0.67)	1.38 (0.51)	0.98 (0.40)
<b>Occipital cortex</b>	0.08 (0.01)	2.52 (0.75)	1.35 (0.54)	0.97 (0.39)
<b>Frontal cortex</b>	0.07 (0.01)	2.70 (0.74)	1.45 (0.51)	0.95 (0.37)
<b>Thalamus</b>	0.08 (0.01)	3.40 (1.17)	1.73 (0.70)	1.04 (0.32)
<b>Caudate</b>	0.07 (0.01)	2.08 (0.86)	1.10 (0.53)	0.98 (0.33)
<b>Putamen</b>	0.07 (0.01)	2.50 (0.83)	1.24 (0.52)	1.10 (0.38)
<b>Hippocampus</b>	0.08 (0.01)	2.72 (0.94)	1.38 (0.54)	1.03 (0.22)
<b>White matter</b>	0.07 (0.01)	2.54 (0.74)	1.21 (0.41)	1.15 (0.21)
<b>Cerebellar cortex</b>	0.08 (0.01)	2.35 (0.77)	1.20 (0.48)	1.03 (0.37)
<b>Cerebellar white matter</b>	0.08 (0.01)	2.65 (0.95)	1.34 (0.52)	1.03 (0.22)
<b>Pallidum</b>	0.08 (0.02)	2.99 (1.05)	1.42 (0.59)	1.20 (0.40)

**Supplemental Table 5: 2TC1K MAB parameters**

MAB	Mean	Mean	Mean	Mean	Mean
2TCM-1K	vB	V <sub>T</sub>	V <sub>ND</sub>	BP <sub>ND</sub> (k <sub>3</sub> /k <sub>4</sub> )	K <sub>b</sub>
Whole brain	0.07 (0.01)	1.85 (0.59)	0.89 (0.40)	1.21 (0.40)	0.09 (0.01)
Temporal cortex	0.07 (0.01)	1.94 (0.67)	0.93 (0.41)	1.19 (0.39)	0.06 (0.01)
Parietal cortex	0.06 (0.01)	2.14 (0.74)	1.01 (0.48)	1.29 (0.49)	0.07 (0.02)
Occipital cortex	0.07 (0.01)	2.23 (0.84)	1.06 (0.51)	1.26 (0.44)	0.05 (0.03)
Frontal cortex	0.07 (0.01)	2.25 (0.79)	1.06 (0.49)	1.28 (0.50)	0.07 (0.07)
Thalamus	0.08 (0.01)	2.41 (0.90)	1.15 (0.55)	1.24 (0.44)	0.11 (0.02)
Caudate	0.06 (0.01)	1.80 (0.83)	0.86 (0.47)	1.22 (0.41)	0.05 (0.01)
Putamen	0.07 (0.01)	2.26 (0.88)	1.04 (0.53)	1.33 (0.46)	0.04 (0.04)
Hippocampus	0.07 (0.01)	1.93 (0.73)	0.94 (0.44)	1.16 (0.43)	0.09 (0.03)
White matter	0.06 (0.01)	1.64 (0.48)	0.77 (0.30)	1.25 (0.41)	0.12 (0.02)
Cerebellar cortex	0.08 (0.01)	2.16 (0.85)	1.01 (0.48)	1.26 (0.39)	0.03 (0.02)
Cerebellar white matter	0.07 (0.01)	1.85 (0.68)	0.90 (0.37)	1.12 (0.39)	0.09 (0.03)

**Supplemental Table 6: 2TC all parameters**

All	Mean	Mean	Mean	Mean
2TCM	vB	V <sub>T</sub>	V <sub>ND</sub>	BP <sub>ND</sub> (k <sub>3</sub> /k <sub>4</sub> )
Whole brain	0.07 (0.02)	3.48 (1.67)	1.57 (0.77)	1.32 (0.64)
Temporal cortex	0.07 (0.02)	3.23 (1.46)	1.39 (0.47)	1.36 (0.67)
Parietal cortex	0.06 (0.03)	3.56 (1.72)	1.67 (0.85)	1.24 (0.61)
Occipital cortex	0.07 (0.03)	3.43 (1.60)	1.50 (0.57)	1.32 (0.62)
Frontal cortex	0.06 (0.03)	3.77 (1.88)	1.79 (0.93)	1.22 (0.61)
Thalamus	0.09 (0.03)	4.94 (2.49)	2.15 (1.13)	1.39 (0.62)
Caudate	0.06 (0.03)	2.95 (1.54)	1.37 (0.77)	1.26 (0.57)
Putamen	0.07 (0.03)	3.66 (1.94)	1.57 (0.77)	1.37 (0.64)
Hippocampus	0.08 (0.02)	3.82 (1.81)	1.57 (0.77)	1.56 (0.82)
White matter	0.07 (0.02)	3.52 (1.64)	1.43 (0.68)	1.55 (0.61)
Cerebellar cortex	0.07 (0.03)	3.32 (1.78)	1.36 (0.52)	1.40 (0.59)
Cerebellar white matter	0.07 (0.02)	3.48 (1.71)	1.42 (0.52)	1.45 (0.56)
Pallidum	0.07 (0.02)	4.33 (2.34)	1.72 (0.95)	1.62 (0.67)



**Supplemental Table 7: 2TC1K all parameters**

All	Mean	Mean	Mean	Mean	Mean
2TCM-1K	vB	V <sub>T</sub>	V <sub>ND</sub>	BP <sub>ND</sub> (k <sub>3</sub> /k <sub>4</sub> )	K <sub>b</sub>
Whole brain	0.07 (0.02)	2.64 (1.43)	1.01 (0.43)	1.62 (0.70)	0.12 (0.04)
Temporal cortex	0.07 (0.02)	2.73 (1.50)	1.10 (0.55)	1.68 (1.12)	0.08 (0.10)
Parietal cortex	0.06 (0.02)	3.05 (1.74)	1.29 (0.71)	1.50 (0.68)	0.08 (0.18)
Occipital cortex	0.07 (0.02)	3.10 (1.68)	1.29 (0.66)	1.50 (0.66)	0.05 (0.21)
Frontal cortex	0.06 (0.02)	3.23 (1.85)	1.39 (0.80)	1.46 (0.65)	0.10 (0.05)
Thalamus	0.08 (0.03)	3.38 (1.79)	1.35 (0.67)	1.60 (0.78)	0.16 (0.03)
Caudate	0.06 (0.03)	2.62 (1.57)	1.11 (0.67)	1.56 (0.90)	0.06 (0.15)
Putamen	0.07 (0.03)	3.26 (1.87)	1.29 (0.72)	1.71 (0.99)	0.06 (0.05)
Hippocampus	0.08 (0.02)	2.61 (1.42)	0.98 (0.45)	1.78 (1.01)	0.13 (0.01)
White matter	0.06 (0.02)	2.25 (1.07)	0.85 (0.33)	1.67 (0.86)	0.17 (0.05)
Cerebellar cortex	0.08 (0.03)	3.07 (1.77)	1.21 (0.59)	1.55 (0.58)	0.04 (0.16)
Cerebellar white matter	0.07 (0.02)	2.56 (1.30)	0.99 (0.37)	1.59 (0.80)	0.13 (0.18)
Pallidum	0.07 (0.02)	2.65 (1.42)	1.01 (0.49)	1.75 (0.83)	0.19 (0.03)