

1 **SUPPLEMENTAL INFORMATIONS**

2 **SUPPLEMENTAL TABLE**

3

Case	Pathologic diagnosis	Clinical diagnosis	Age	Sex	Braak	CERAD score	Thal amyloid phase
DLB	TLBD	DLB vs PSP	57	Male	I		0
MSA-1	MSA	Meniere disease	82	Male	II		1
MSA-2	MSA	MSA-P	56	Female	I		0
MSA-3	MSA	MSA-P	59	Male	I		1
AD-1	AD	FTLD-NOS	69	Male	III	3	
AD-2	AD	AD probable	58	Male	III	3	

4

5

6 **Table S1.** Antemortem clinical diagnosis and neuropathologic description of  
7 postmortem human brain tissues, Related to Figure 1, 7. Braak, Braak  
8 neurofibrillary tangle stage; DLB, dementia with Lewy bodies; TLBD, Lewy body  
9 disease, transitional type; PSP, progressive supranuclear palsy; MSA, multiple  
10 system atrophy; MSA-P, MSA with predominant parkinsonism; AD, Alzheimer's  
11 disease; FTLD-NOS, frontotemporal lobar degeneration not otherwise specified.

12

13

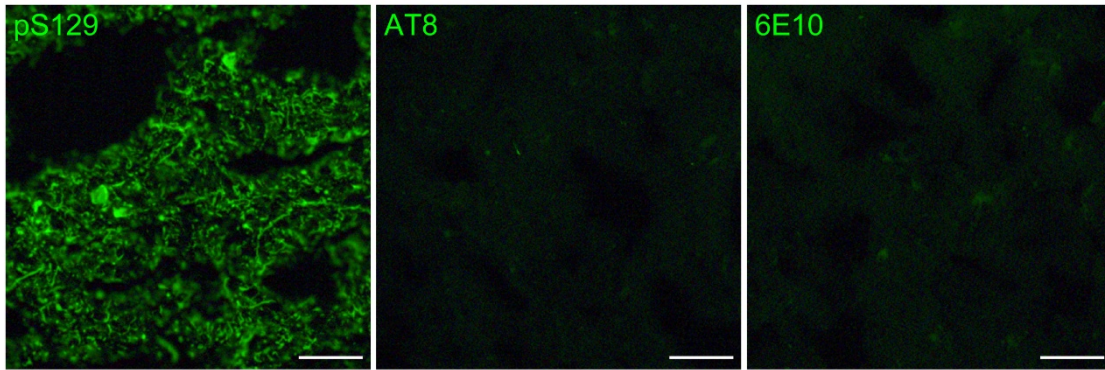
14

15

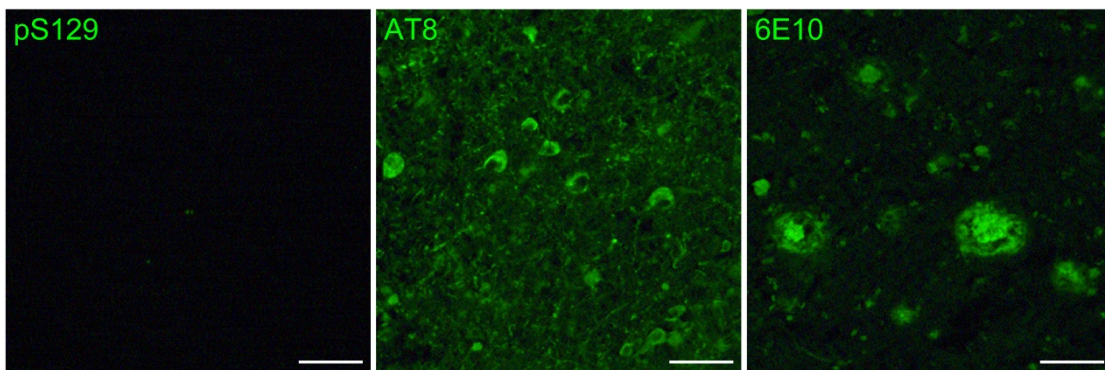
1 **SUPPLEMENTAL FIGURES**

2

**A**



**B**



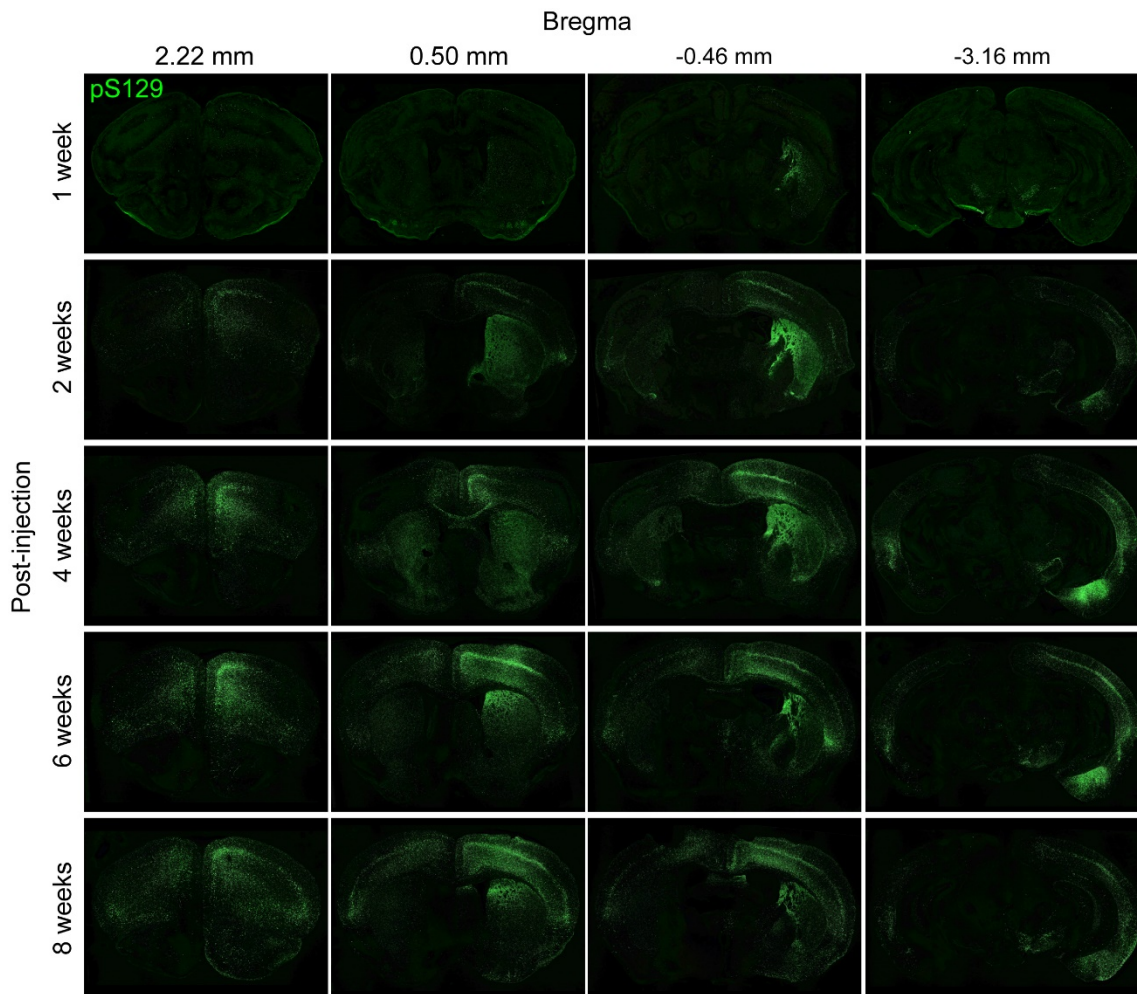
3

4

5 **Figure S1.** Immunostaining of DLB and AD brain sections used for  
6 characterization of ligands, Related to Figure 1.

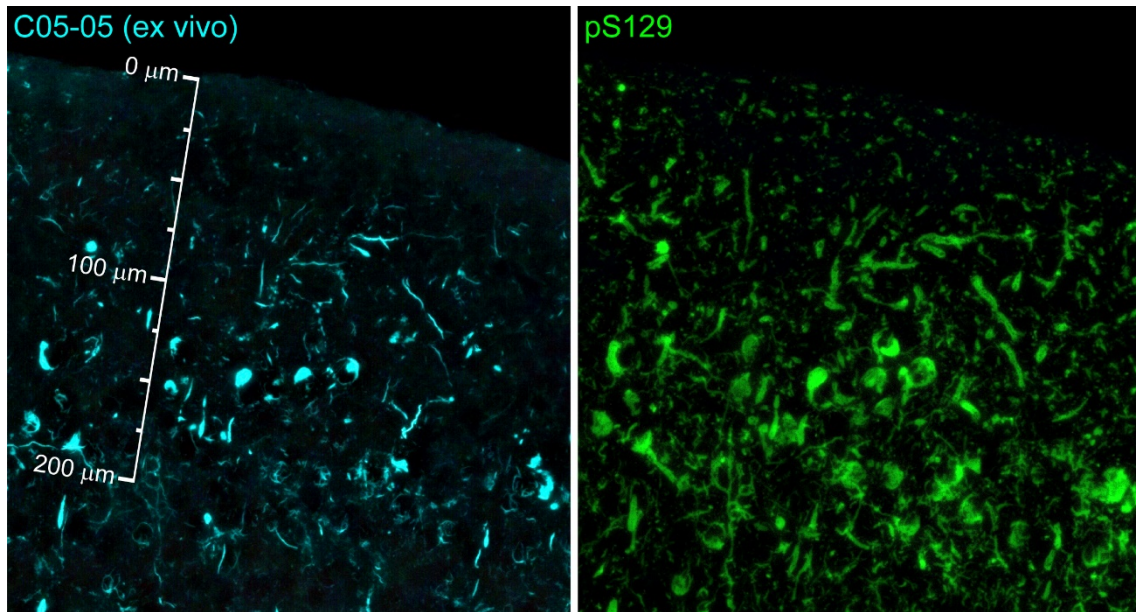
7 **(A)** Immunostaining of amygdala sections derived from a DLB patient with pS129  
8 (left), AT8 (middle), and 6E10 (right) confirms the absence of tau and A $\beta$  deposit  
9 in this brain tissue. **(B)** Immunostaining of middle frontal gyrus sections derived  
10 from an AD patient with pS129 (left), AT8 (middle), and 6E10 (right) confirms the  
11 absence of  $\alpha$ -synuclein deposits in this brain tissue.

12



1  
2  
3 **Figure S2.** Temporal changes in the distribution of phosphorylated  $\alpha$ -synuclein  
4 inclusions in mice injected with  $\alpha$ -synuclein fibrils into the striatum, Related to  
5 Figure 3-5.

6 Phosphorylated  $\alpha$ -synuclein proteins were immunostained with pS129 in coronal  
7 brain sections at bregma +2.22, +0.5, -0.46, and -3.16 mm derived from mice at  
8 1, 2, 4, 6, and 8 weeks after inoculation of  $\alpha$ -synuclein into the right striatum.  
9

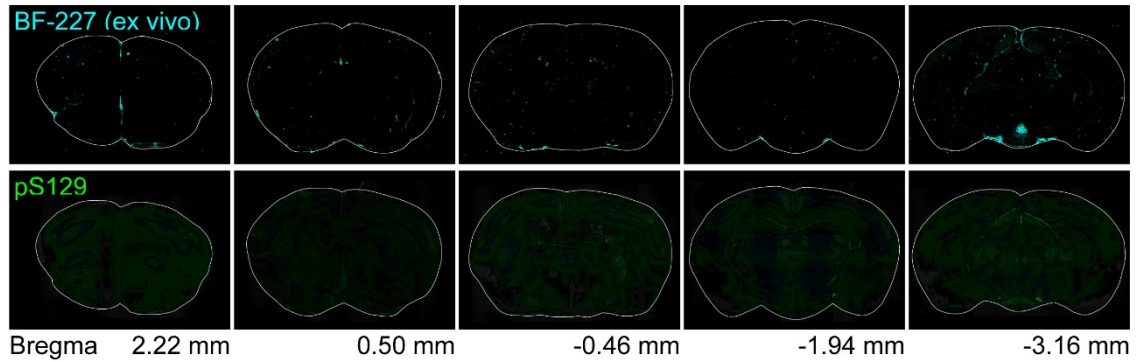


1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14

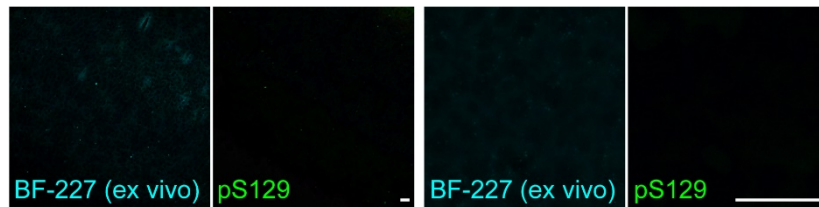
**Figure S3.** *Ex vivo* examination of brain sections from a mouse injected with  $\alpha$ -synuclein fibrils into the neocortex, Related to Figure 2.

*Ex vivo* examination of frozen brain sections from mouse injected with  $\alpha$ -synuclein fibrils into cortex at 11 weeks after injection to detect intraperitoneally administered C05-05 (1.66 mg/kg) (left), and immunolabeling of adjacent brain section with pS129 (right). This  $\alpha$ -Syn mouse was the same as used for *in vivo* two-photon laser microscopic imaging (Figure 3). High-power photomicrographs of cortical sections demonstrated abundant accumulation of C05-05 positive- $\alpha$ -synuclein inclusions in somatosensory cortex of this  $\alpha$ -Syn mouse.

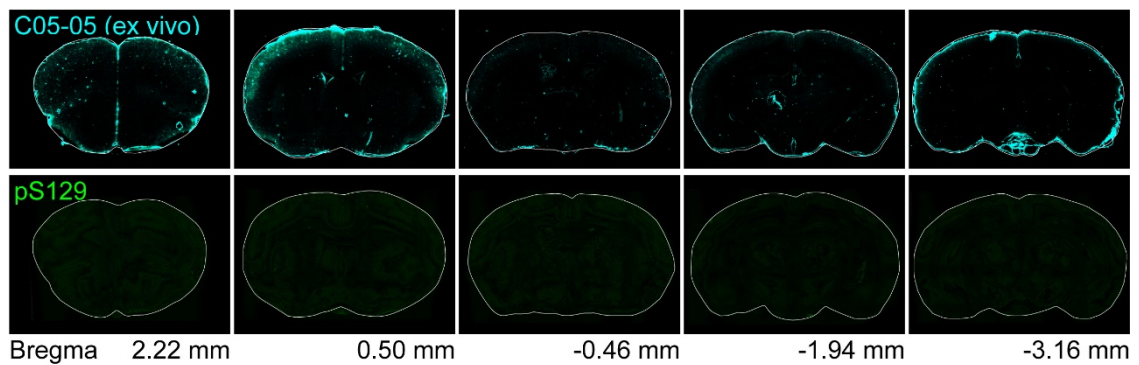
**A**



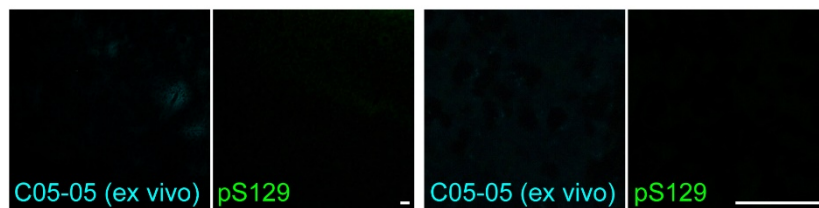
**B**



**C**



**D**

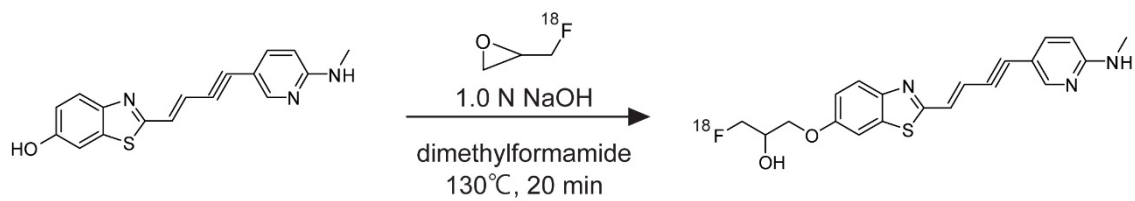
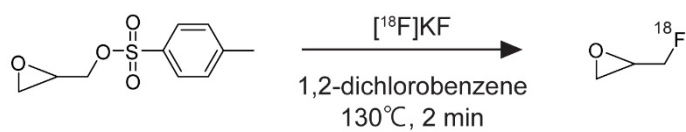


1  
2

3 **Figure S4.** *Ex vivo* examination of brain sections from control mice, Related to  
4 Figure 3.

5 (A) *Ex vivo* microscopic examination of frozen brain sections from a mouse at 10  
6 weeks after injection of saline into the right striatum. The brain was taken at 2

1 hours after intraperitoneal administration of BF-227 (1.66 mg/kg), and BF-227-  
2 derived signals (top) and immunolabeling with pS129 (bottom) were examined in  
3 adjacent brain sections. From left, coronal brain sections at bregma +2.22, +0.50,  
4 -0.46, -1.94, and -3.16 mm are displayed. **(B)** Medium-power (left) and high-  
5 power (right) photomicrographs of cortical sections shown in **A**. *Ex vivo*  
6 examination revealed no apparent signals originating from intraperitoneally  
7 administered BF-227 in the cerebral parenchyma of the control mouse. **(C)** *Ex*  
8 *vivo* examination of frozen brain sections from a mouse at 8 weeks after injection  
9 of saline into the right striatum. The brain was taken at 90 min after intraperitoneal  
10 administration of C05-05 (1.66 mg/kg), and C05-05-derived signals (top) and  
11 immunolabeling with pS129 (bottom) were examined in adjacent brain sections.  
12 From the left, coronal brain sections at bregma +2.22, +0.50, -0.46, -1.94, and -  
13 3.16 mm are displayed. **(D)** Medium-power (left) and high-power (right)  
14 photomicrographs of cortical sections shown in **C**. *Ex vivo* examination revealed  
15 no apparent signals originating from of intraperitoneally administered C05-05 in  
16 the cerebral parenchyma of the control mouse. Scale bars, 50  $\mu$ m (**B** and **D**).  
17

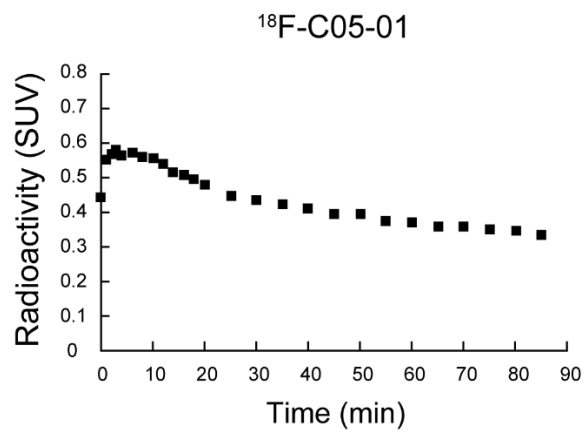


Phenolic precursor of  $^{18}\text{F}$ -C05-05  
(C05-03)

$^{18}\text{F}$ -C05-05

1  
2  
3  
4

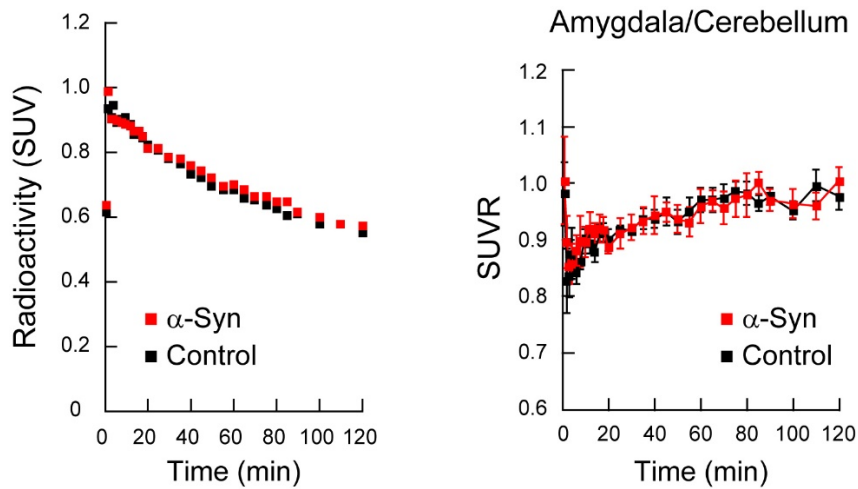
**Figure S5.** Radiosynthesis of  $^{18}\text{F}$ -C05-05, Related to Figure 5-7.



1  
2  
3  
4  
5  
6  
7

**Figure S6.** Brain uptake of  $^{18}\text{F}$ -C05-01 in wild-type mice, Related to Figure 5. Time-radioactivity curves were generated in the frontal cortex of wild-type mice over 90 min after intravenous injection of  $^{18}\text{F}$ -C05-01. Data are presented as mean in two mice.

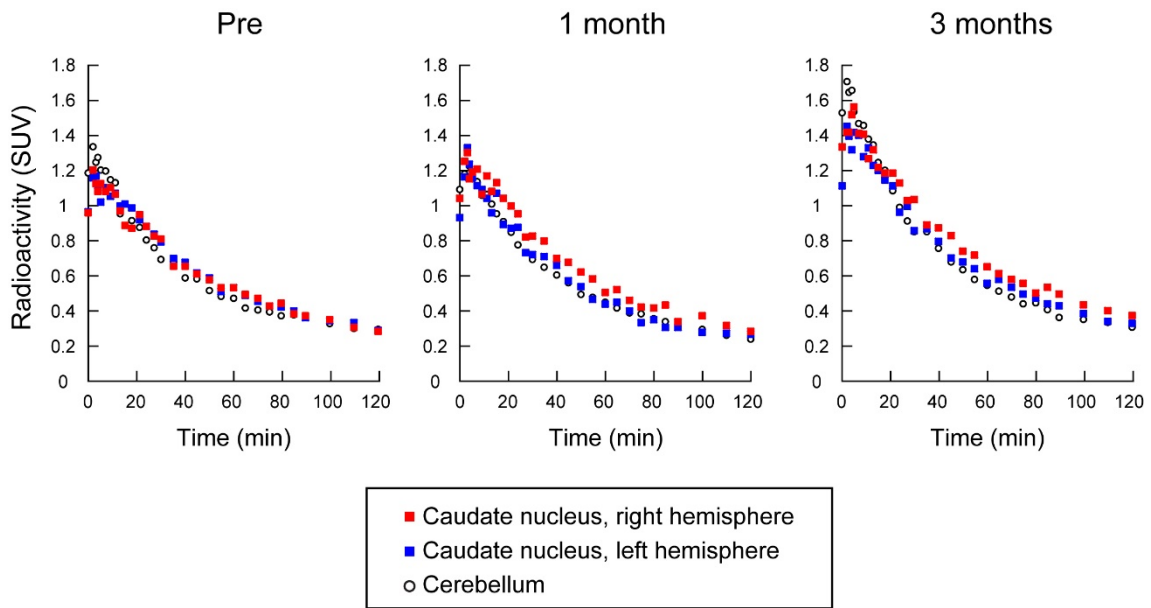




1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11

**Figure S7.** Time-radioactivity curves of  $^{18}\text{F}$ -C05-05 in the amygdala of  $\alpha$ -Syn and control mice, Related to Figure 5.

Time-radioactivity curves in the amygdala (left), and the amygdala-to-cerebellum ratio of radioactivity (SUVR, right) at 0 - 120 min after intravenous administration of  $^{18}\text{F}$ -C05-05 ( $30.8 \pm 0.4$  MBq) in mice at 6 months after injection of  $\alpha$ -synuclein fibrils ( $\alpha$ -Syn mouse, red symbols) or saline (control mouse, black symbols) into the bilateral striata. Data are presented as mean (left) or mean  $\pm$  SEM (right) in four mice.



1  
2  
3  
4  
5  
6  
7  
8  
9

**Figure S8.** Time-radioactivity curves of  $^{18}\text{F}$ -C05-05 in the brain of an  $\alpha$ -Syn marmoset, Related to Figure 6.  
 Time-radioactivity curves in the right and left caudate nuclei and cerebellum at 0 - 120 min after intravenous administration of  $^{18}\text{F}$ -C05-05 ( $89.6 \pm 15.3$  MBq) in an  $\alpha$ -Syn marmoset before (Pre), and 1 and 3 months after inoculation.