Harmonization of protocols for the manual tracing of the hippocampus - an EADC-ADNI joint effort
AUTHOR-CERTIFIED PROTOCOL FEATURES AND TRACINGS

Killiany RJ, Moss MB, Albert MS, Sandor T, Tieman J, Jolesz F.
Temporal lobe regions on magnetic resonance imagingidentify patients with early Alzheimer's disease.
Arch Neurol. 1993; 50:949-54.

In the following section you can find:

1) An excerpt of the Survey of the with anatomical landmarks according to Killiany et al.'s criteria.

2)The hippocampal tracing on consecutive coronal slices of a 1.5T ADNI control subject (**2A**) and AD patient (**2B**).

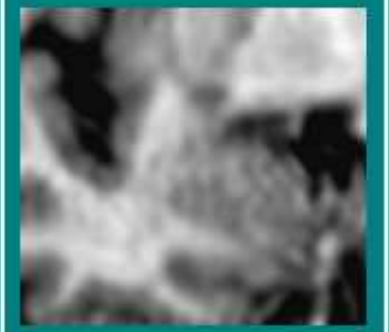
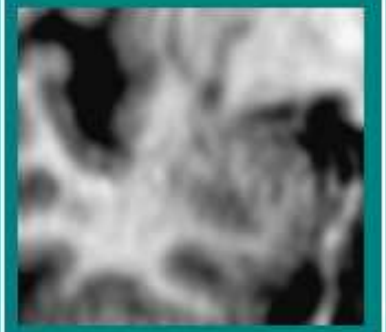
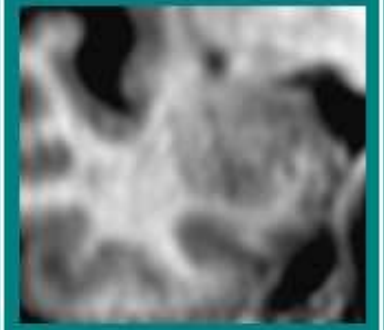
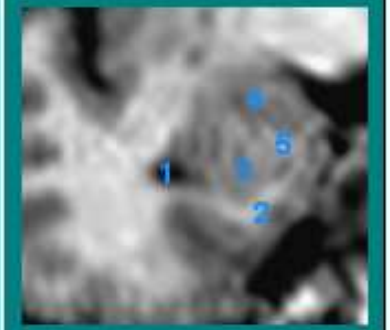
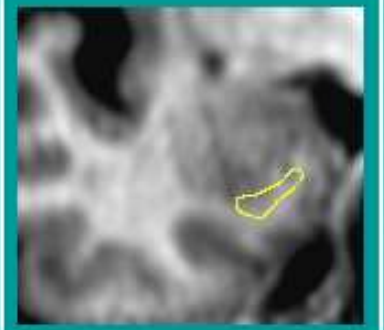
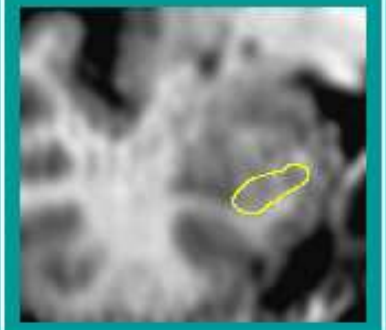
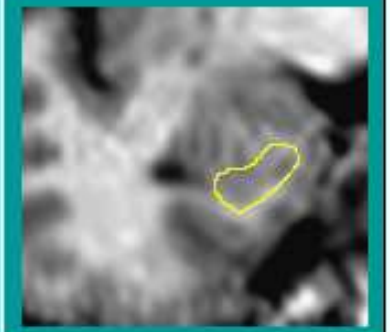
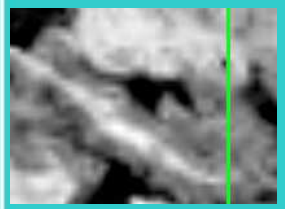
This document has been endorsed by Ron Killiany (email: killiany@bu.edu) on 21/12/2009.

1) Excerpt of the Survey of the anatomical landmarks according to Killiany et al.'s criteria.

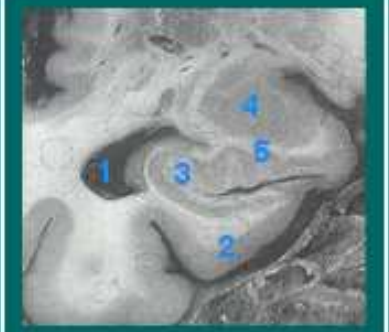
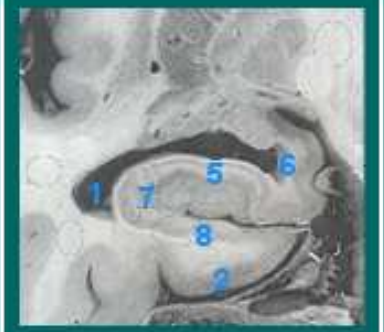
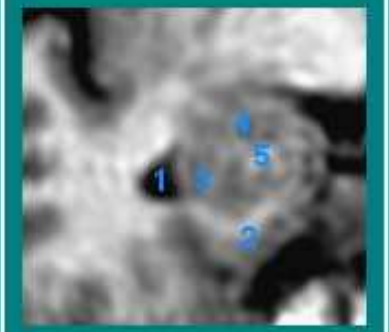
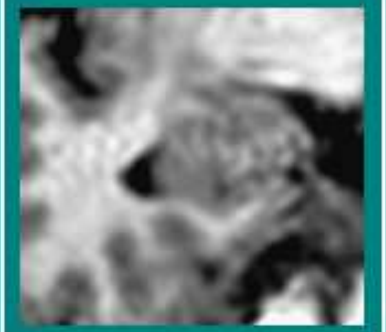
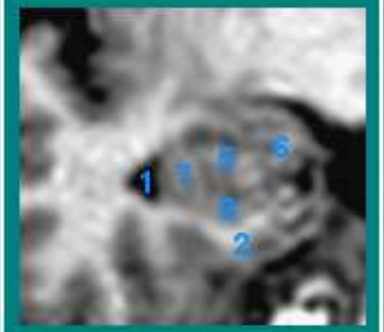
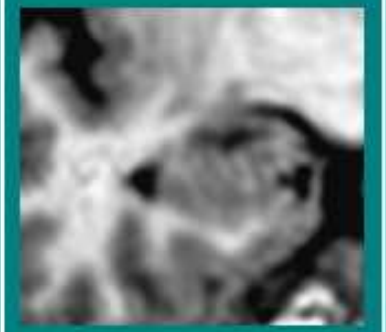
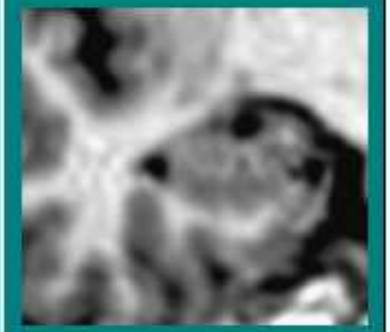
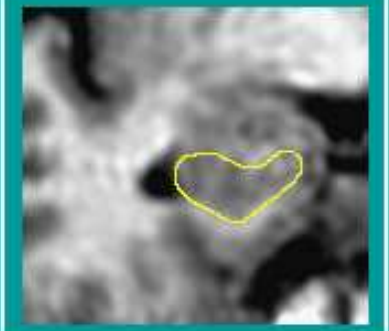
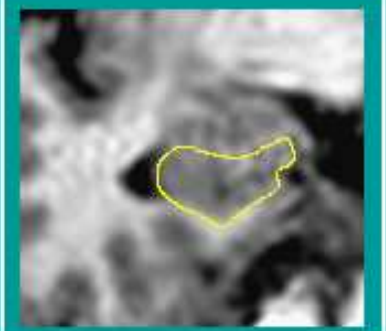
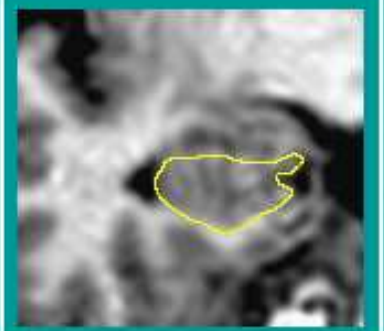
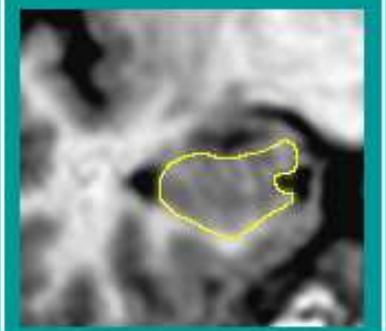
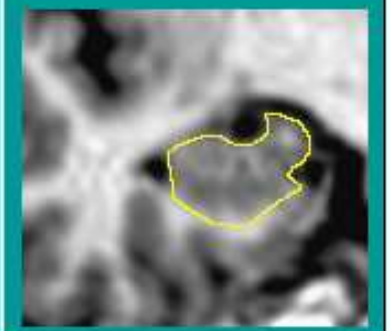
Plane			
AC-PC line			
Start tracing			
from head to tail			
Areas explicitly included	**Areas explicitly excluded**	**Most anterior slice**	**Most posterior slice**
portion of subiculum, CA fields	choroid plexus of inferior horn, amygdala, alveus and fimbria	level at which the alveus appears and distinguishes the amygdala from hippocampus	slice where the crus of fornix was visible in full profile

BOUNDARIES				
	Lateral border	**Inferior border**	**Medial border**	**Superior border**
HEAD	temporal horn of the lateral ventricle	white matter of the parahippocampal gyrus	a oblique line following the same inclination of WM of PG connect the inferior part of the subiculum to the quadrigeminal cistern	temporal horn of the lateral ventricle
BODY	temporal horn of the lateral ventricle	white matter of the parahippocampal gyrus	a oblique line following the same inclination of WM of PG connect the inferior part of the subiculum to the quadrigeminal cistern	temporal horn of the lateral ventricle
TAIL	temporal horn of the lateral ventricle	white matter of the parahippocampal gyrus	a oblique line following the same inclination of WM of PG connect the inferior part of the subiculum to the quadrigeminal cistern	temporal horn of the lateral ventricle

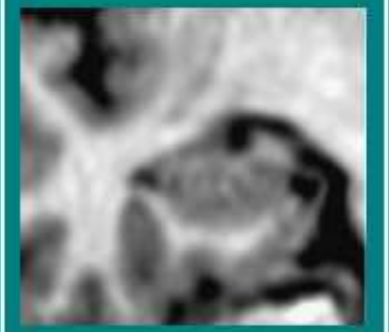
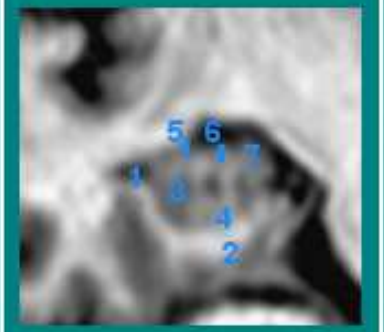
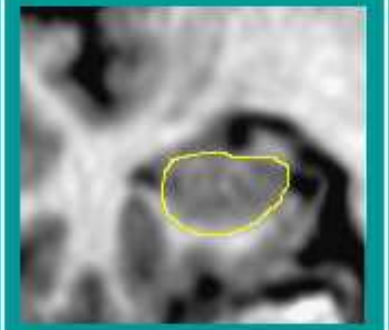
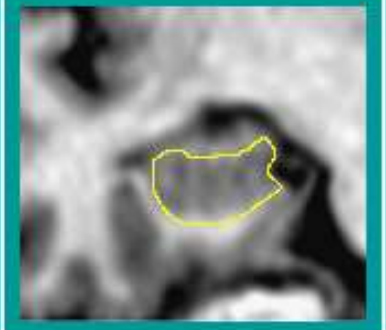
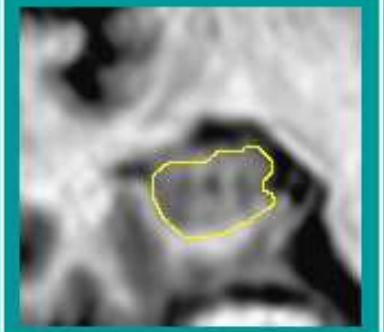
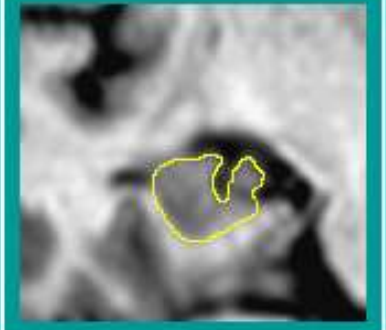
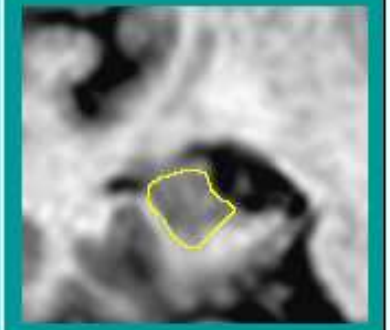
2A)CTRL

	80	81	82	83	84
Anatomical section					
Native MRI					
Tracing					
Notes			**Most anterior slice:** level at which the alveus distinguishes the amygdala from hippocampus  Sagittal view		1=Temporal horn of the lateral ventricle (uncal recess) 2=Parahippocampal gyrus 3=Hippocampal head 4=Amygdala 5=Alveus

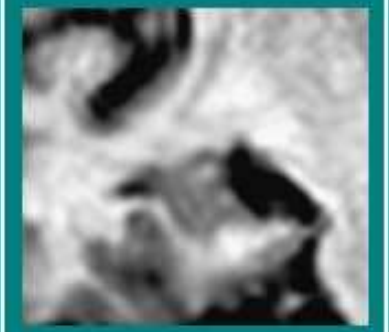
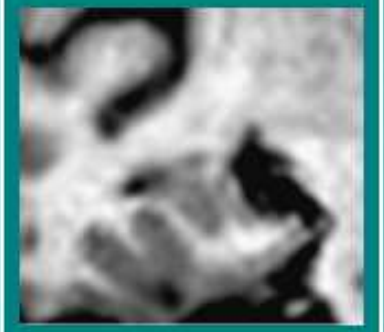
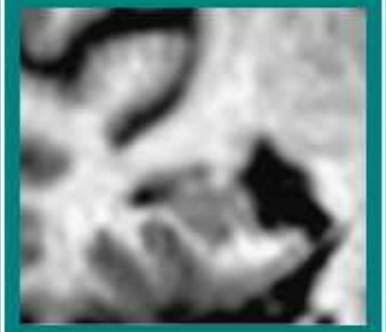
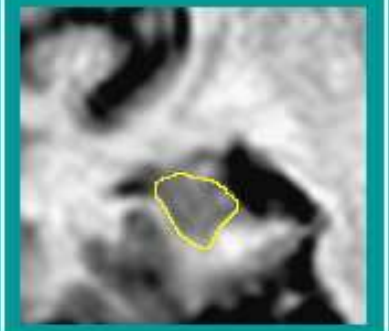
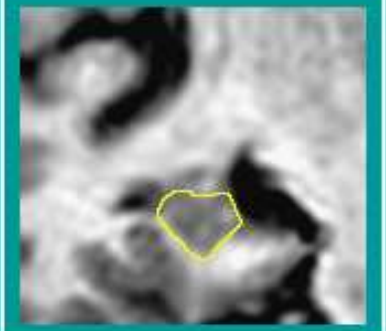
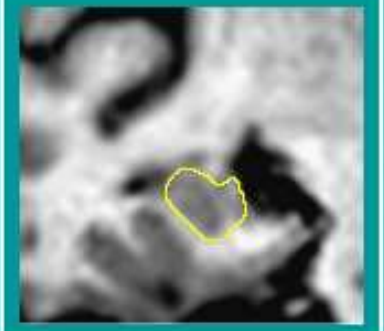
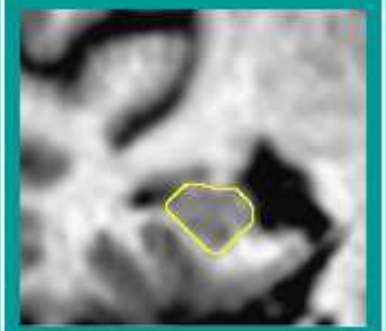
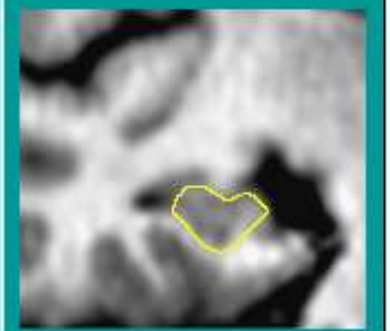
2A)CTRL

	85	86	87	88	89
Anatomical section					
Native MRI					
Tracing					
Notes	1=Temporal horn of the lateral ventricle 2=Parahippocampal gyrus 3=Hippocampal head 4=Amygdala 5=Alveus		1=Temporal horn of the lateral ventricle 2=Parahippocampal gyrus 5=Alveus 6=Vertical digitation 7=Cornu Ammonis 8=Subiculum		

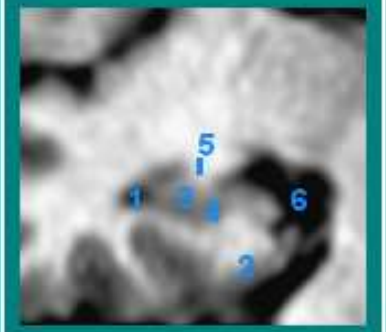
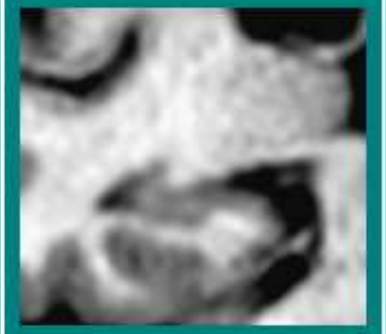
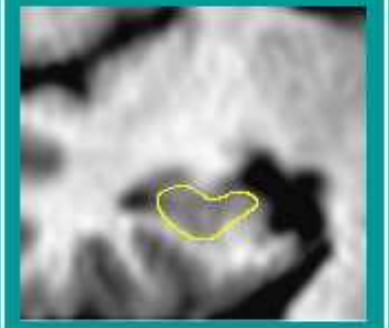
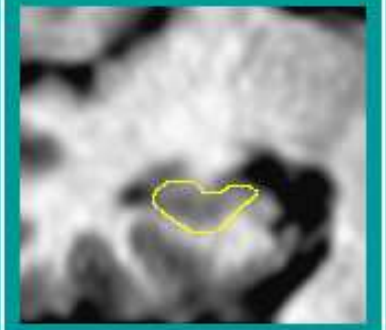
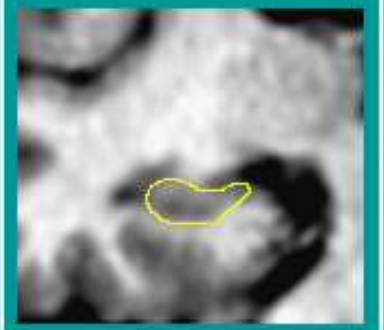
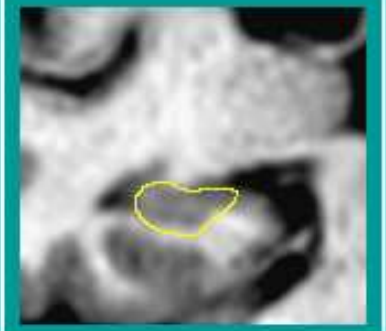
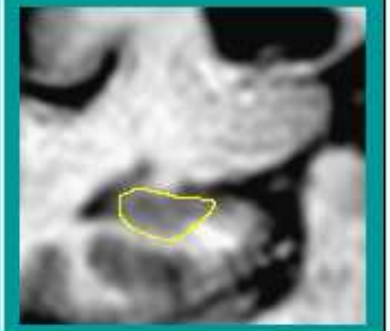
2A)CTRL

	90	91	92	93	94
Anatomical section					
Native MRI					
Tracing					
Notes		Alveus and fimbria excluded	1=Temporal horn of the lateral ventricle 2=Parahippocampal gyrus 3=Dentate gyrus 4=Subiculum 5=Alveus 6=Fimbria 7=Uncal apex		

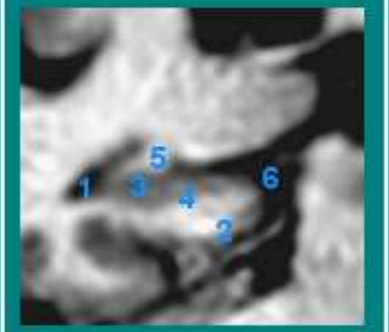
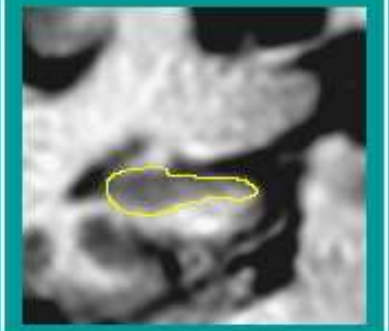
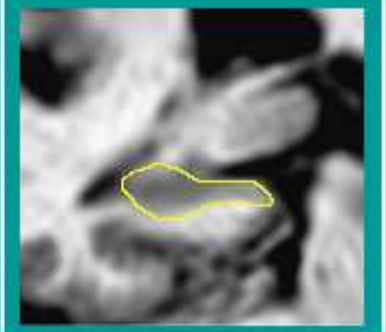
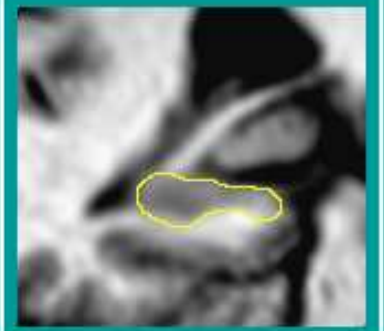
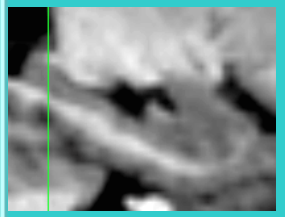
2A)CTRL

	95	96	97	98	99
Anatomical section					
Native MRI					
Tracing					
Notes		MEDIAL BORDER: a oblique line following the same inclination of WM of PG connect the inferior part of the subiculum to the quadrigeminal cistern			

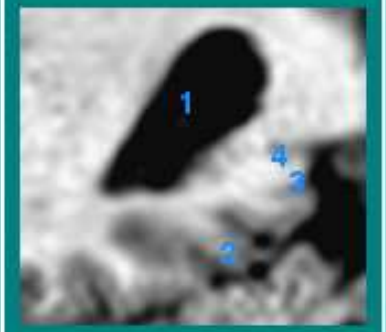
2A)CTRL

	100	101	102	103	104
Anatomical section					
Native MRI					
Tracing					
Notes		1=Temporal horn of the lateral ventricle 2=Parahippocampal gyrus 3=Dentate gyrus 4=Subiculum 5=Fimbria 6=Ambient cistern			

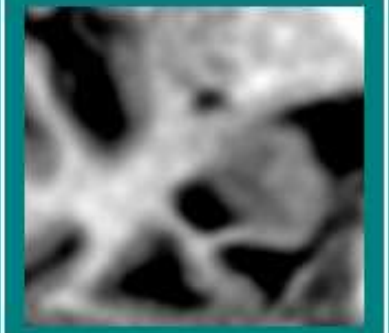
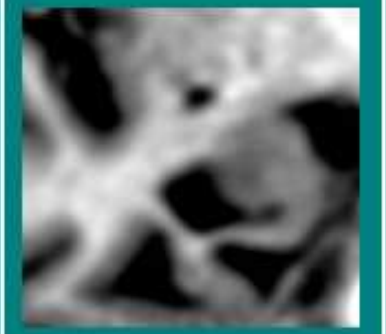
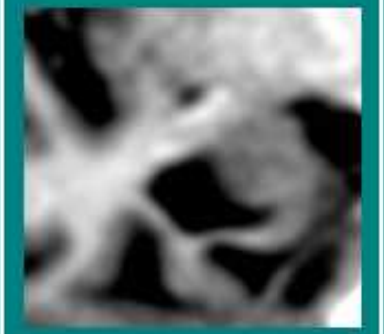
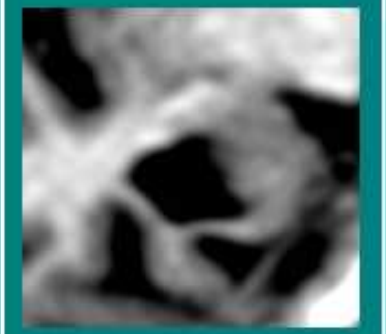
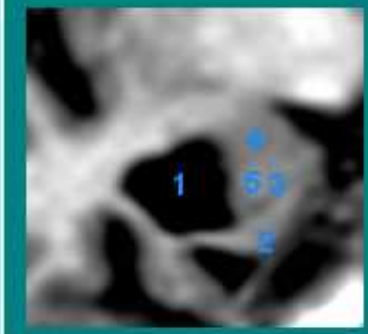
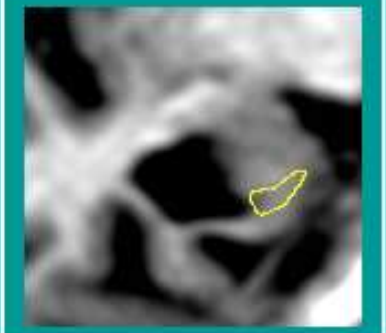
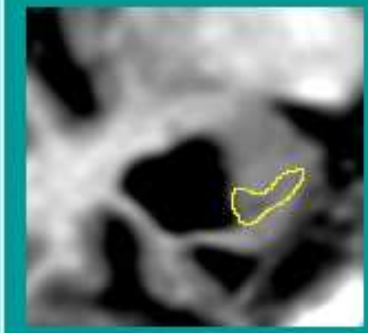
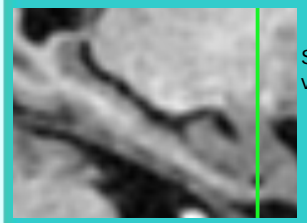
2A)CTRL

	105	106	107	108	109
Anatomical section					
Native MRI					
Tracing					
Notes	1=Temporal horn of the lateral ventricle 2=Parahippocampal gyrus 3=Dentate gyrus 4=Subiculum 5=Fimbria 6=Ambient cistern	**Most posterior slice :** slice where the crus of fornix was visible in full profile  Sagittal view			

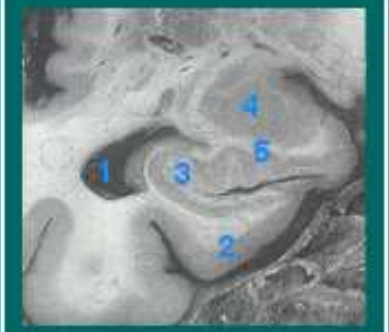
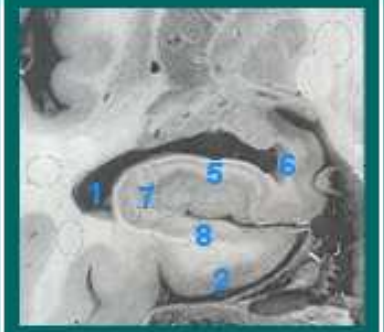
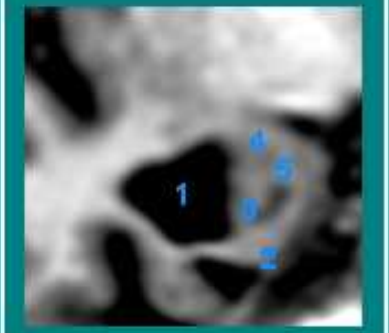
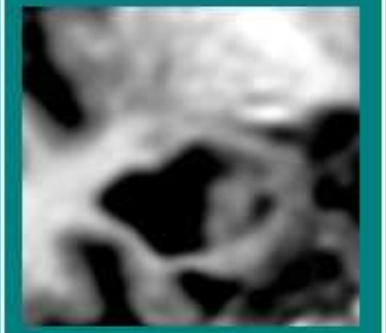
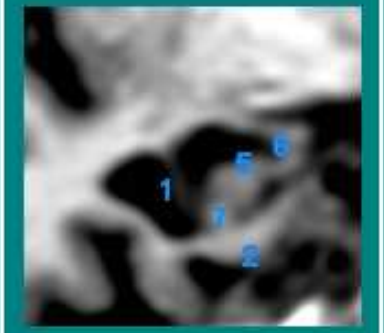
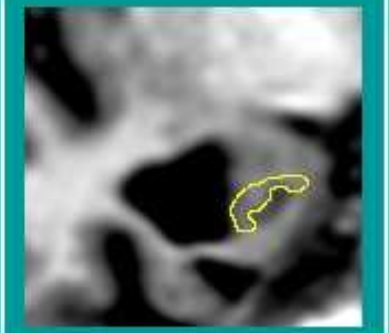
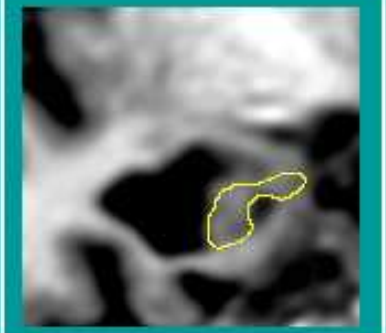
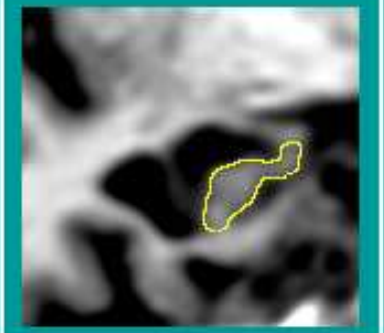
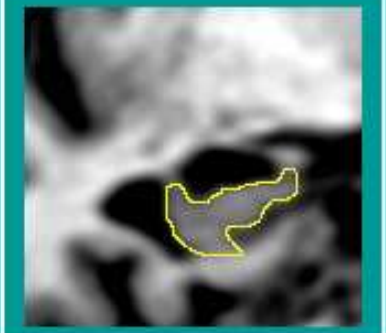
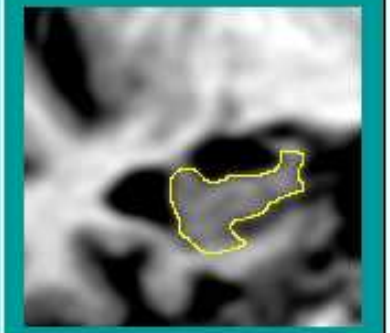
2A)CTRL

	110	111	112	113	114
Anatomical section					
Native MRI					
Tracing					
Notes	1=Temporal horn of the lateral ventricle (uncal recess) 2=Parahippocampal gyrus 3=Isthmus 4=Cornu Ammonis 5=Gyrus dentatus 6=Crus of fornix			1=Temporal horn of the lateral ventricle (uncal recess) 2=Parahippocampal gyrus 3=Isthmus 4=Cornu Ammonis	

2B) AD

	79	80	81	82	83
Anatomical section					
Native MRI					
Tracing					
Notes				**Most anterior slice:** level at which the alveus distinguishes the amygdala from hippocampus  Sagittal view	1=Temporal horn of the lateral ventricle (uncal recess) 2=Parahippocampal gyrus 3=Hippocampal head 4=Amygdala 5=Alveus

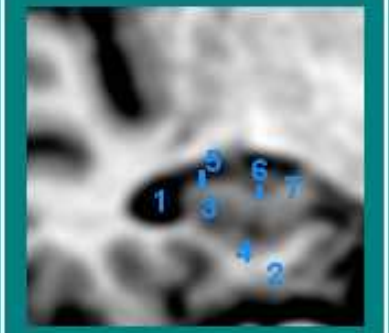
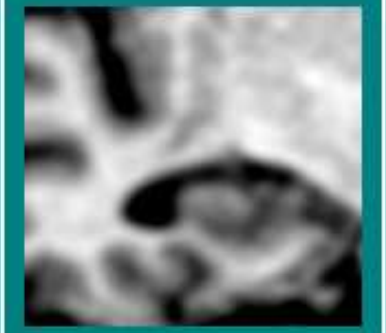
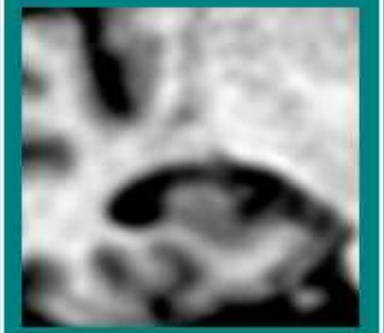
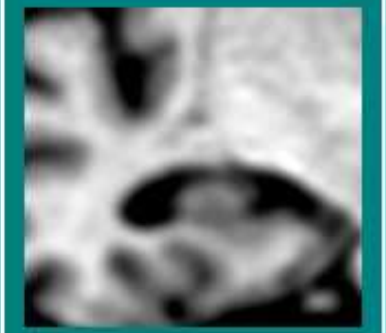
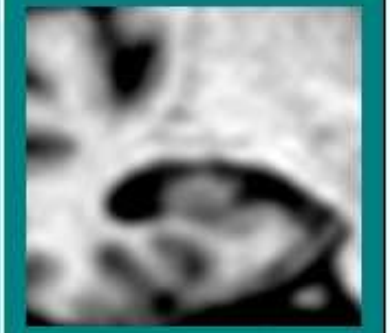
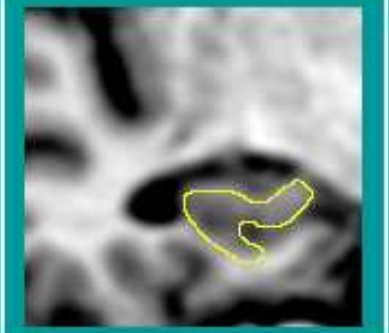
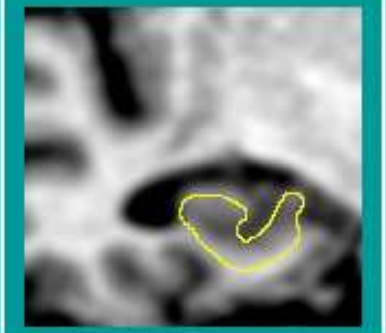
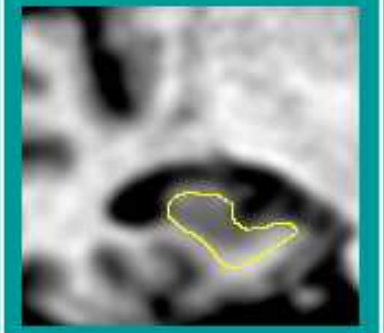
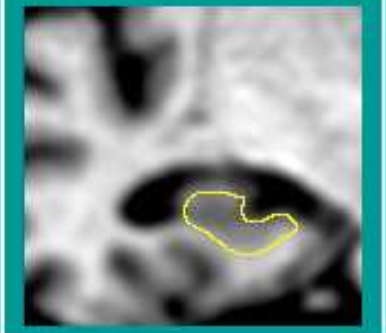
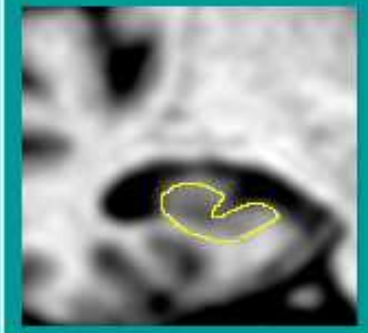
2B) AD

	84	85	86	87	88
Anatomical section					
Native MRI					
Tracing					
Notes	1=Temporal horn of the lateral ventricle 2=Parahippocampal gyrus 3=Hippocampal head 4=Amygdala 5=Alveus		1=Temporal horn of the lateral ventricle 2=Parahippocampal gyrus 5=Alveus 6=Vertical digitation 7=Cornu Ammonis 8=Subiculum		

2B) AD

Anatomical section	89	90	91	92	93
Native MRI					
Tracing					
Notes					

2B) AD

	94	95	96	97	98
Anatomical section					
Native MRI					
Tracing					
Notes	1=Temporal horn of the lateral ventricle 2=Parahippocampal gyrus 3=Dentate gyrus 4=Subiculum 5=Alveus 6=Fimbria 7=Uncal apex				

2B) AD

	99	100	101	102	103
Anatomical section					
Native MRI					
Tracing					
Notes					

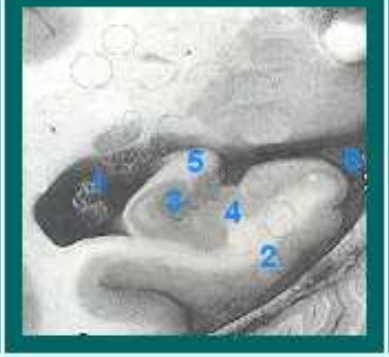
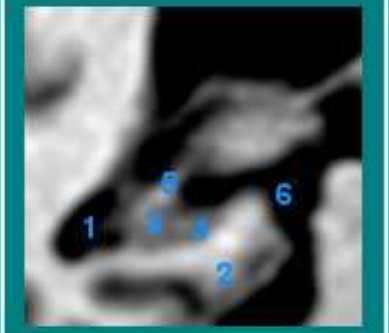
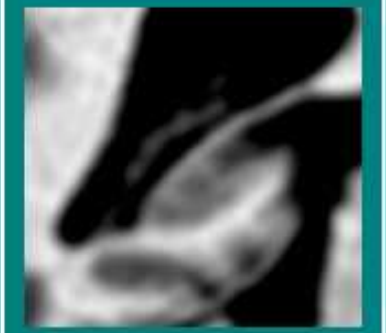
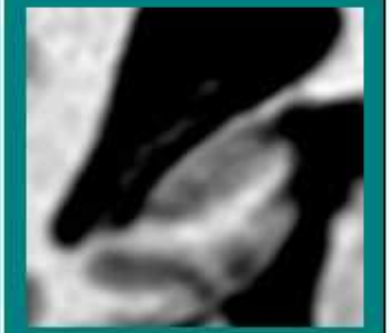
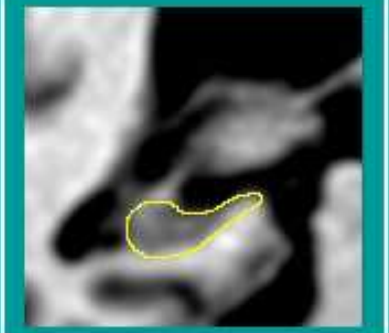
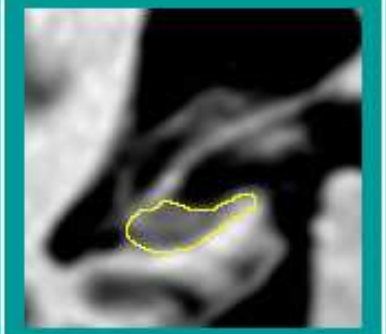
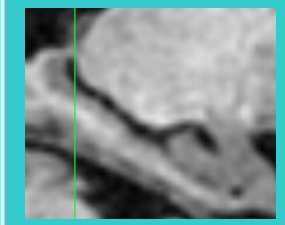
2B) AD

Anatomical section	104	105	106	107	108
Native MRI					
Tracing					
Notes					

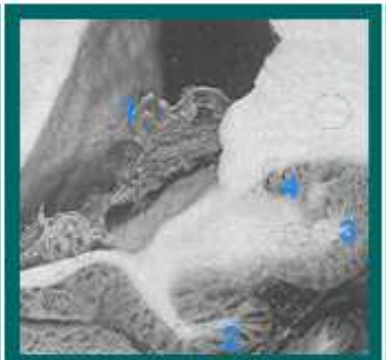
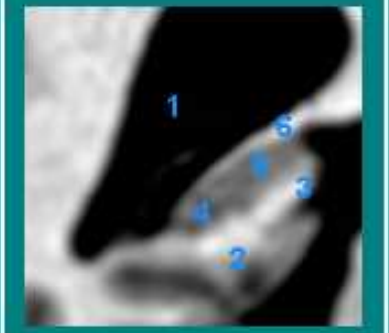
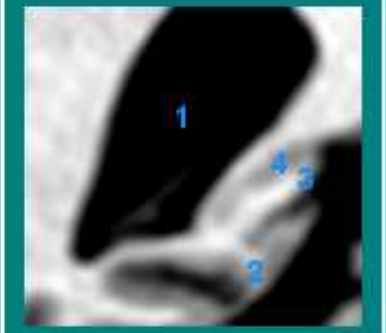
2B) AD

	109	110	111	112	113
Anatomical section					
Native MRI					
Tracing					
Notes					

2B) AD

	114	115	116	117	118
Anatomical section					
Native MRI					
Tracing					
Notes	1=Temporal horn of the lateral ventricle 2=Parahippocampal gyrus 3=Dentate gyrus 4=Subiculum 5=Fimbria 6=Ambient cistern	**Most posterior slice :** slice where the crus of fornix was visible in full profile  Sagittal view			

2B) AD

	119	120	121	122	123
Anatomical section					
Native MRI					
Tracing					
Notes	1=Temporal horn of the lateral ventricle (uncal recess) 2=Parahippocampal gyrus 3=Isthmus 4=Cornu Ammonis 5=Gyrus dentatus 6=Crus of fornix			1=Temporal horn of the lateral ventricle (uncal recess) 2=Parahippocampal gyrus 3=Isthmus 4=Cornu Ammonis	