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

Haller JW, Banerjee A, Christensen GE, Gado M, Joshi S, Miller MI, Sheline Y, Vannier MW, Csernansky JG. Three-dimensional hippocampal MR morphometry with high-dimensional transformation of a neuroanatomic atlas. Radiology. 1997; 202:504-10.

In the following section you can find:

1) An excerpt of the Survey of anatomical landmarks according to Haller&Csernansky et al.'s criteria.

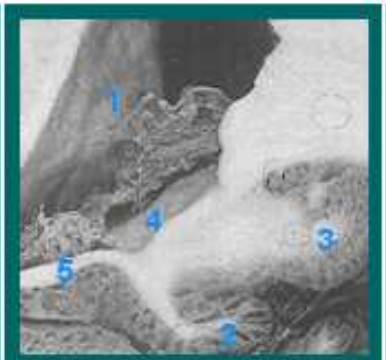
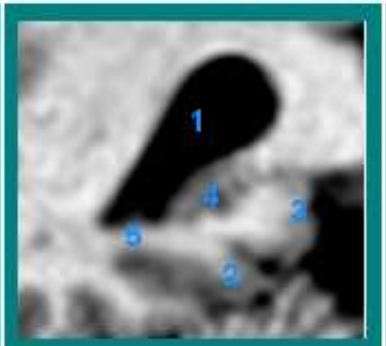
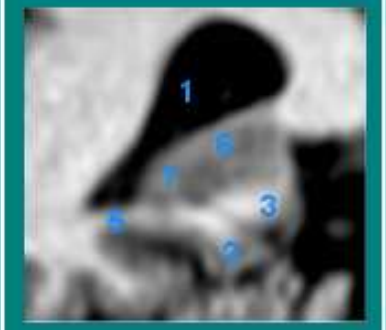
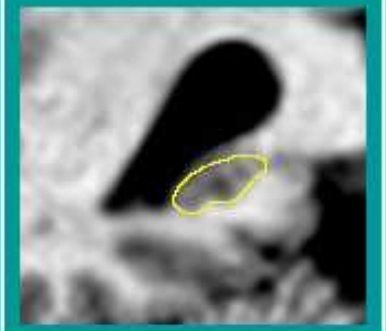
2) The hippocampal tracing on consecutive coronal slices of a 1.5T ADNI control subject (**2A**) and AD patient (**2B**).

This document has been endorsed by John G. Csernansky (email: jgc@northwestern.edu) on 21/12/2009.

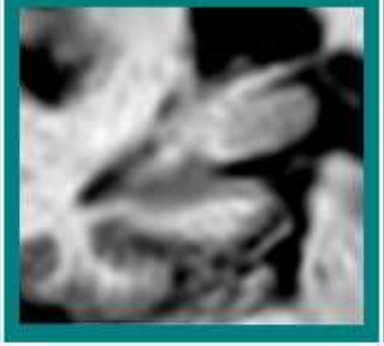
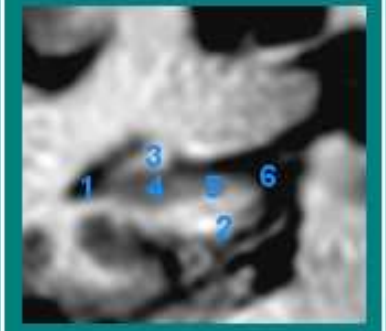
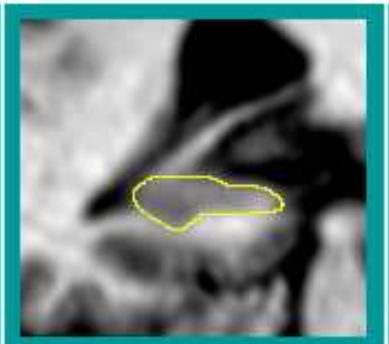
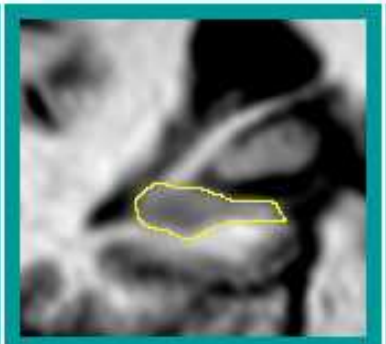
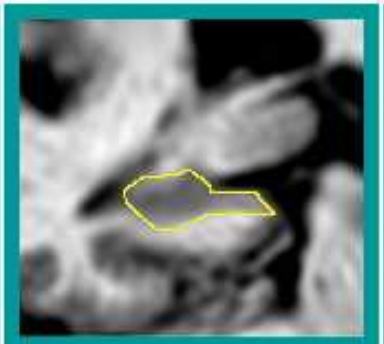
1) Excerpt of the Survey of anatomical landmarks according to Haller&Csernansky et al.'s criteria.

Plane				
AC-PC line				
Start tracing				
from tail to head				
Plane tracing	**Areas explicitly included**	**Areas explicitly excluded**	**Most anterior slice**	**Most posterior slice**
axial + coronal + sagittal	Cornu Ammonis, subiculum, vertical digitation	alveus and fimbria	the separation of amygdala and hippocampal head was facilitated by sagittal and transverse views	coronal section in which the hippocampus first appeared adjacent to the trigone of lateral venticle
BOUDARIES				
	Lateral border	**Inferior border**	**Medial border**	**Superior border**
HEAD	identified by the contrast of the WM or CSF	WM of parahippocampal gyrus (PHG)	Gyrus ambiens	identified by the contrast of the WM or CSF
BODY	identified by the contrast of the WM or CSF	WM of parahippocampal gyrus	The medial border of the HC was continued with a straight horizontal line (marking the inferior border of CA and subiculum) across the cortex of the PHG. The cortex below this line was considered the PHG, and the cortex above this line was included as a part of the HC	identified by the contrast of the WM or CSF
TAIL	identified by the contrast of the WM or CSF	WM of parahippocampal gyrus	The medial border of the HC was continued with a straight horizontal line (marking the inferior border of CA and subiculum) across the cortex of the PHG. The cortex below this line was considered the PHG, and the cortex above this line was included as a part of the HC	identified by the contrast of the WM or CSF, and Thalamus and caudate nucleus

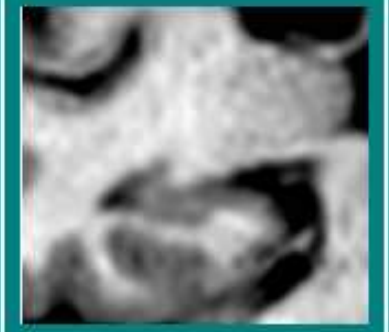
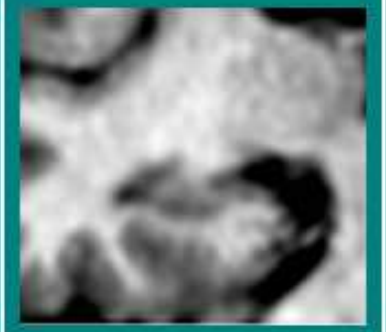
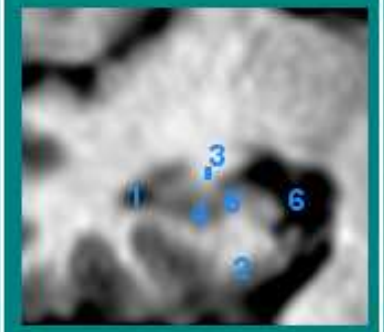
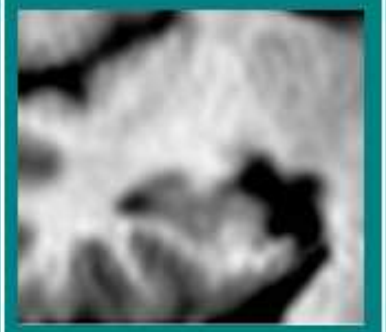
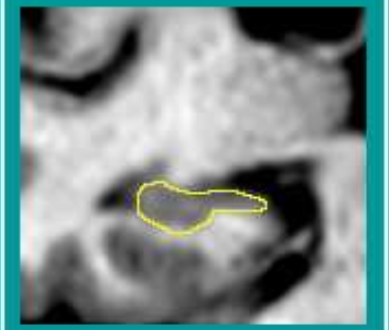
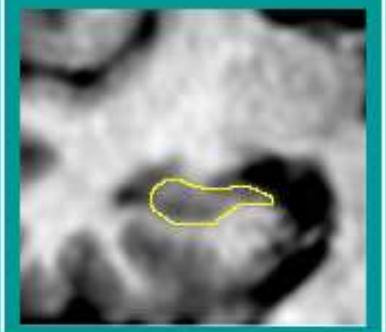
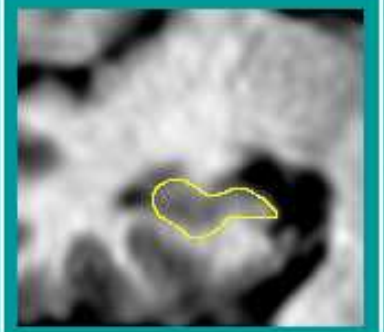
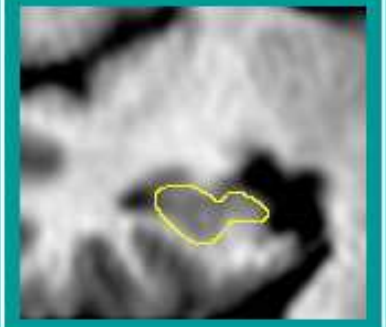
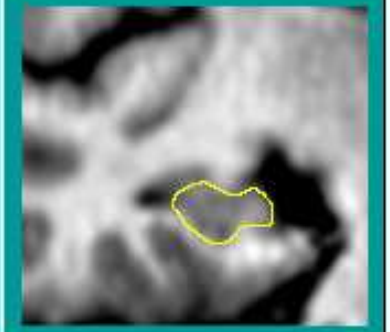
2A)CTRL

	113	112	111	110	109
Anatomical section					
Native MRI					
Tracing					
Notes		**Most posterior slice:** coronal section in which the hippocampus first appeared adjacent to the trigone of lateral venticle  Sagittal view	1=atrium of the lateral ventricle 2= parahippocampal gyrus 3=isthmus 4=hippocampal tail 5=collateral trigone	1=atrium of the lateral ventricle 2= parahippocampal gyrus 3=isthmus 5=collateral trigone 6=gyrus dentatus 7=cornu Ammonis	

2A)CTRL

	108	107	106	105	104
Anatomical section					
Native MRI					
Tracing					
Notes				1=lateral ventricle 2= parahippocampal gyrus 3=fimbria (not included) 4=gyrus dentatus 5=subiculum 6=ambient cistern	

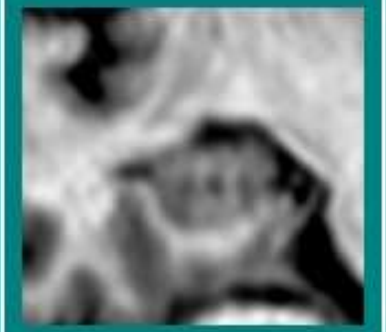
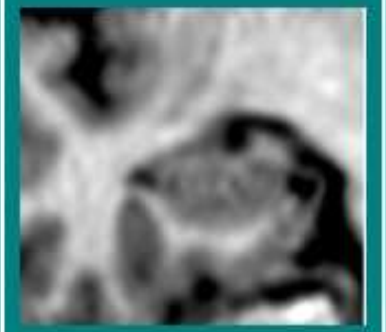
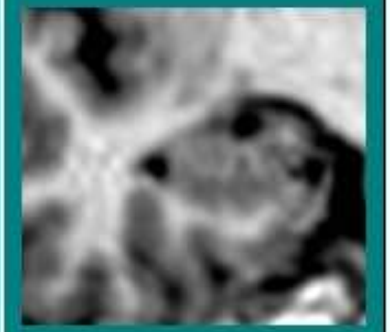
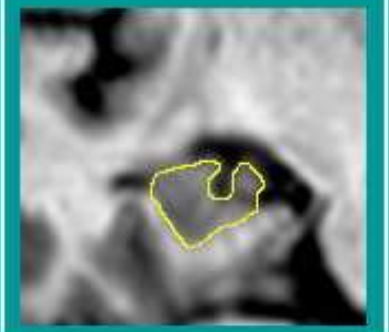
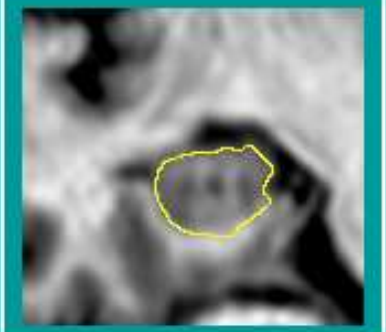
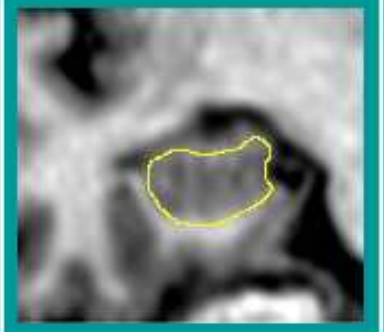
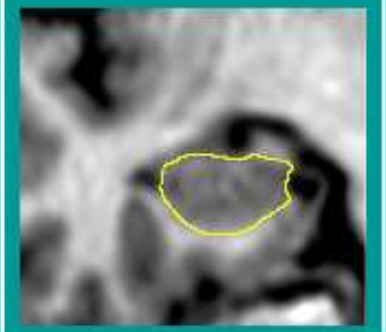
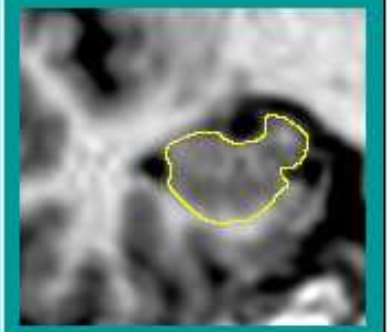
2A)CTRL

	103	102	101	100	99
Anatomical section					
Native MRI					
Tracing					
Notes			1=lateral ventricle 2= parahippocampal gyrus 3=fimbria (not included) 4=gyrus dentatus 5=subiculum 6=ambient cistern		

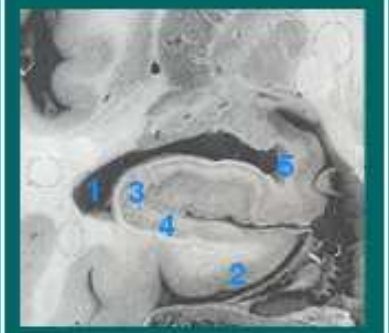
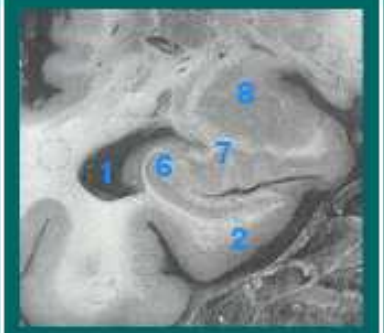
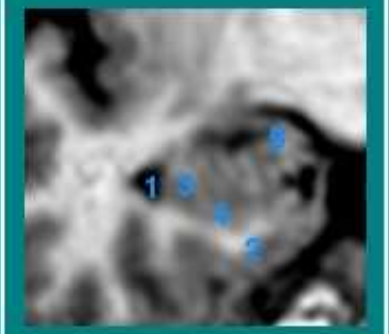
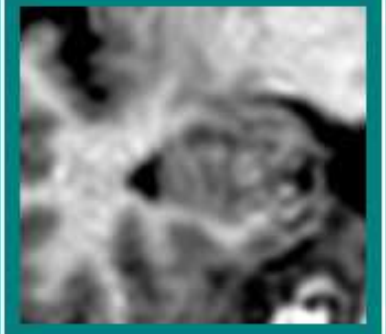
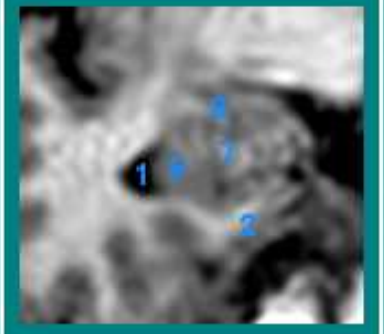
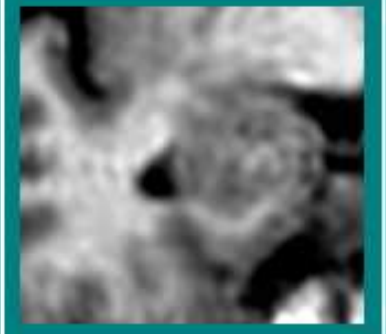
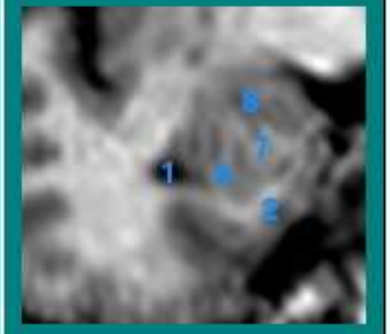
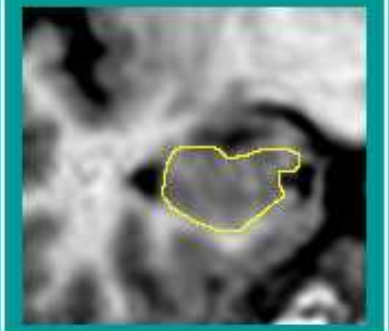
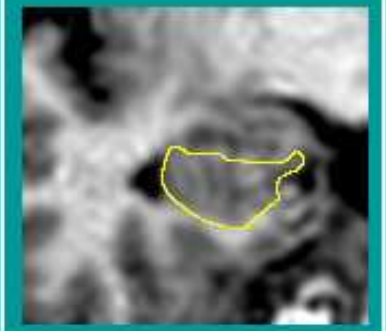
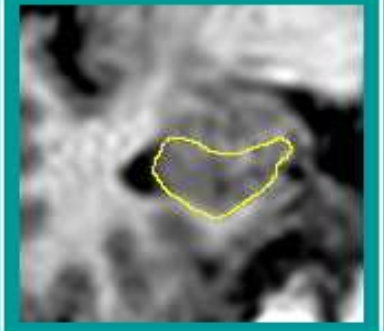
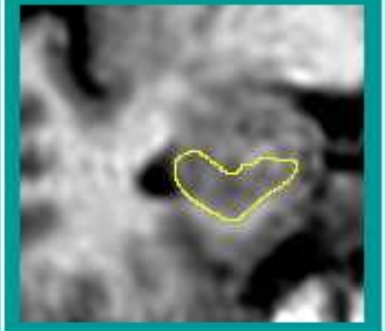
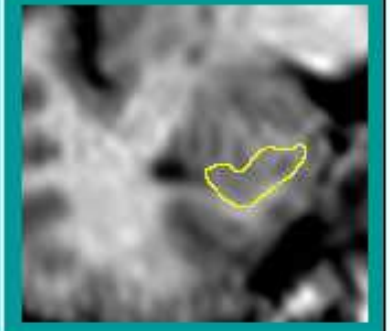
2A)CTRL

Anatomical section	98	97	96	95	94
Native MRI					
Tracing					
Notes					

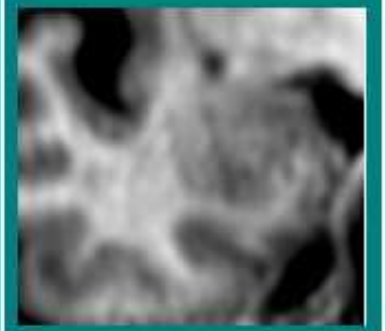
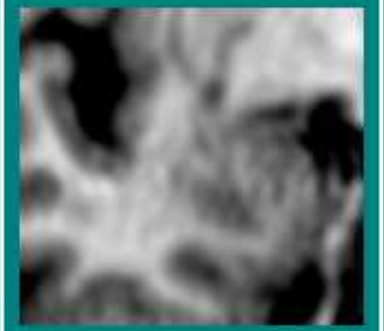
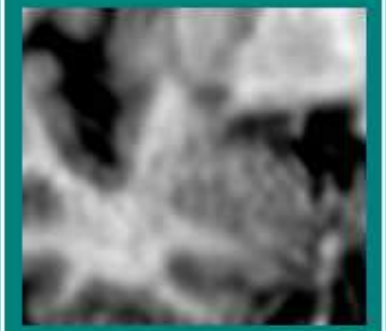
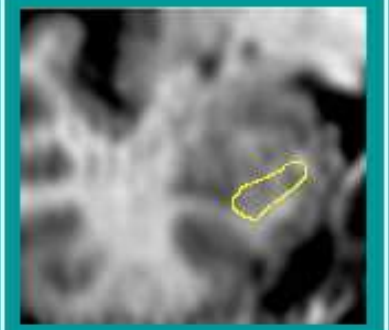
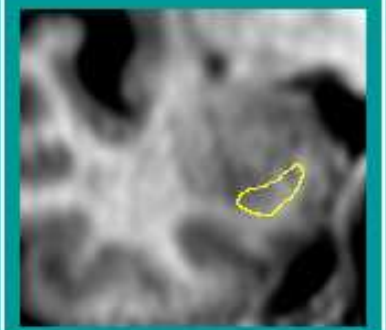
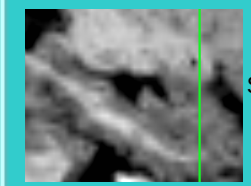
2A)CTRL

	93	92	91	90	89
Anatomical section					
Native MRI					
Tracing					
Notes			1=uncal sulcus 2=lateral ventricle 3=alveus 4=fimbria 5=parahippocampal gyrus 6=gyrus dentatus 7=subiculum		

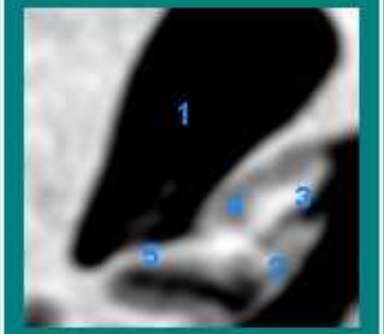
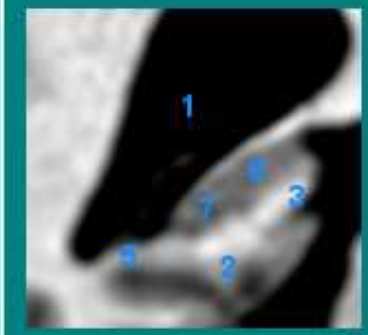
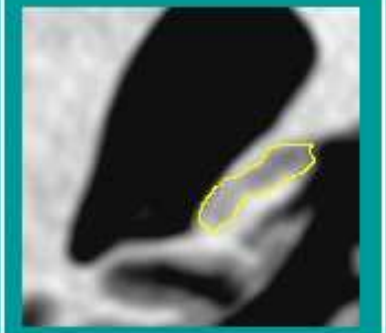
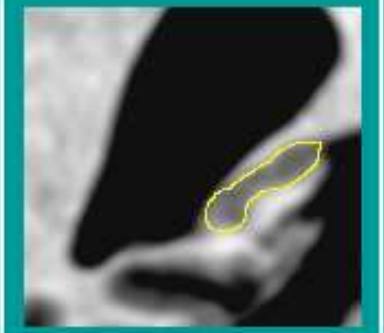
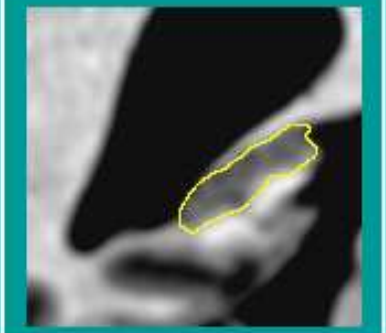
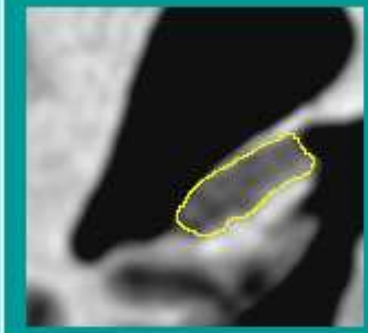
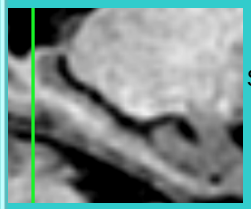
2A)CTRL

	88	87	86	85	84
Anatomical section					
Native MRI					
Tracing					
Notes	1=lateral ventricle 2=parahippocampal gyrus 3=cornu Ammonis 4=subiculum 5=vertical digitation		1=lateral ventricle 2=parahippocampal gyrus 6=hippocampal head 7=alveus 8=Amygdala		1=lateral ventricle 2=parahippocampal gyrus 6=hippocampal head 7=alveus 8=Amygdala

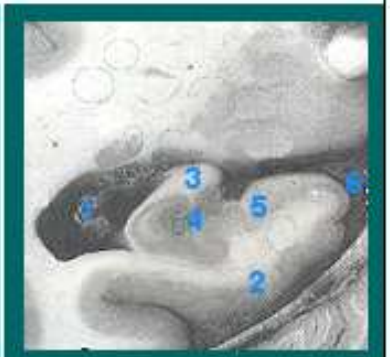
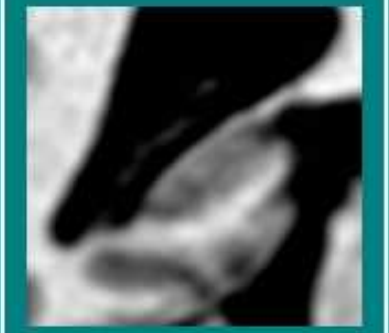
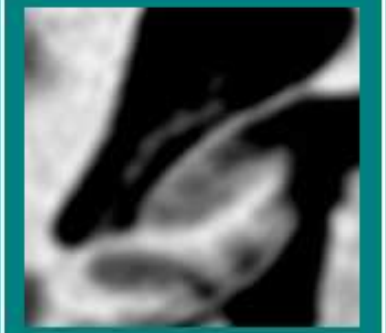
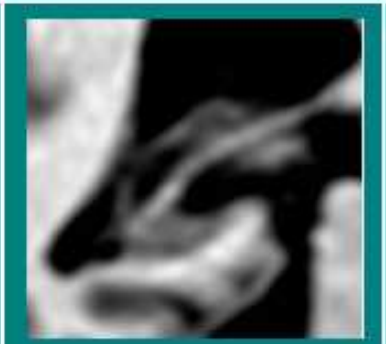
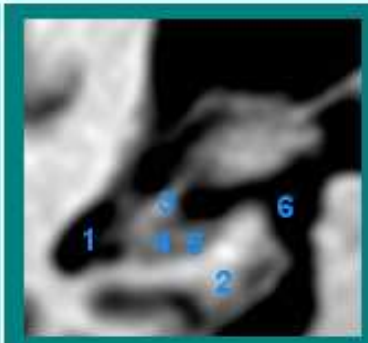
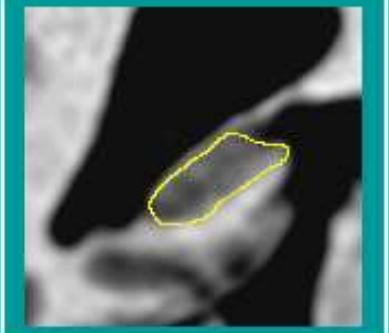
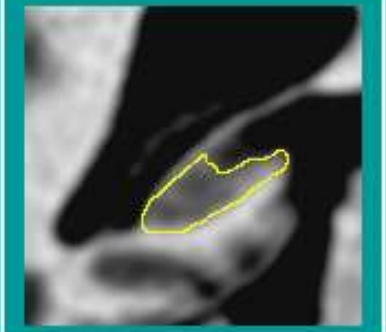
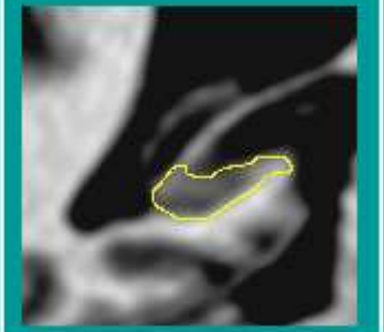
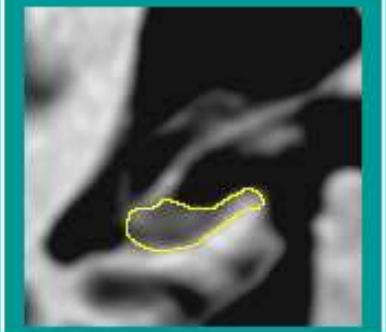
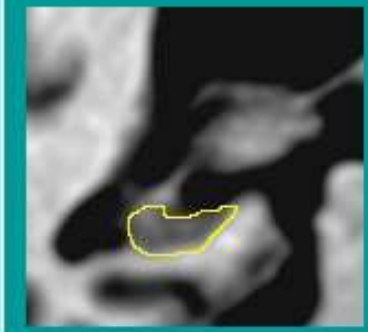
2A)CTRL

	83	82	81	80	
Anatomical section					
Native MRI					
Tracing					
Notes		**Most anterior slice:** the separation of amygdala and hippocampal head was facilitated by sagittal and transverse views  Sagittal view			

2B) AD

	123	122	121	120	119
Anatomical section					
Native MRI					
Tracing					
Notes		**Most posterior slice:** coronal section in which the hippocampus first appeared adjacent to the trigone of lateral venticle  Sagittal view	1=atrium of the lateral ventricle 2= parahippocampal gyrus 3=isthmus 4=hippocampal tail 5=collateral trigone		1=atrium of the lateral ventricle 2= parahippocampal gyrus 3=isthmus 5=collateral trigone 6=gyrus dentatus 7=cornu Ammonis

2B) AD

	118	117	116	115	114
Anatomical section					
Native MRI					
Tracing					
Notes					1=lateral ventricle 2= parahippocampal gyrus 3=fimbria (not included) 4=gyrus dentatus 5=subiculum 6=ambient cistern

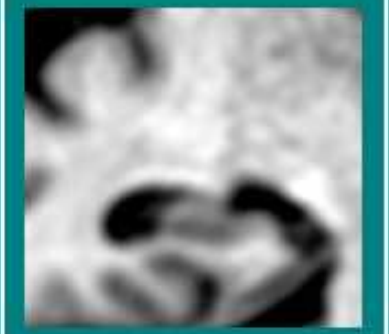
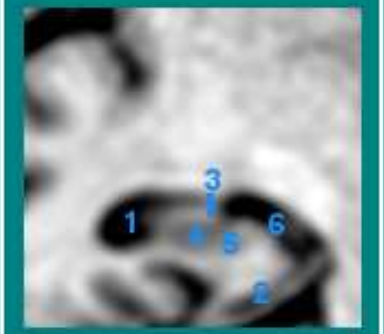
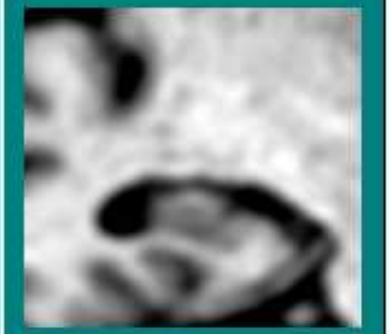
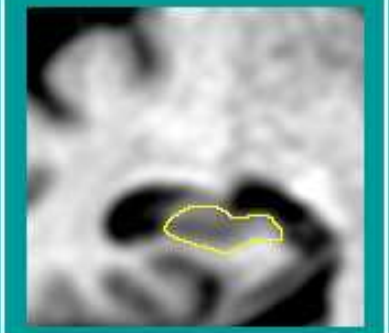
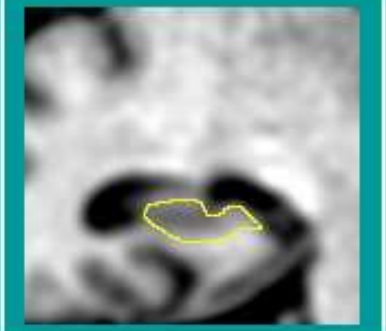
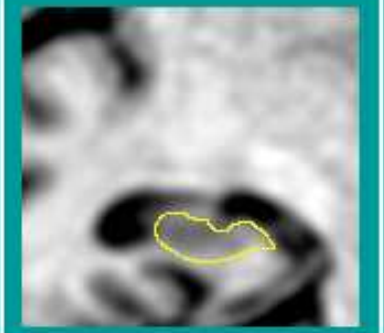
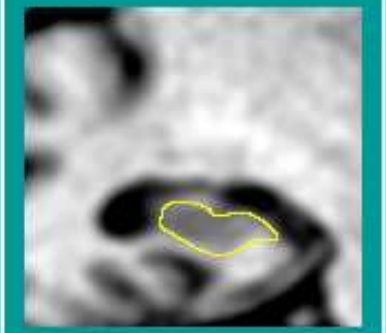
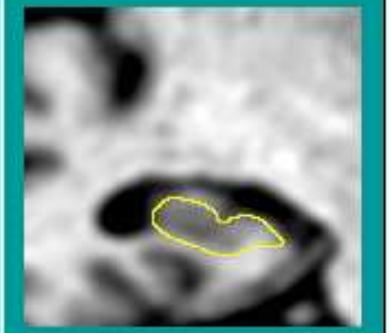
2B) AD

	113	112	111	110	109
Anatomical section					
Native MRI					
Tracing					
Notes					

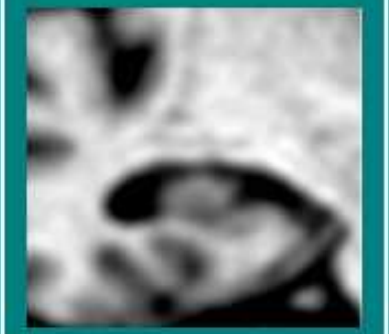
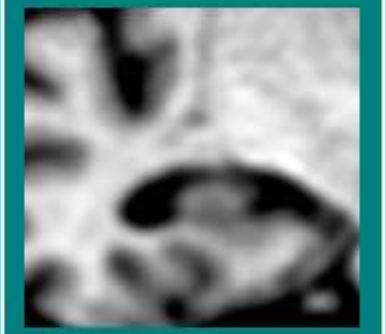
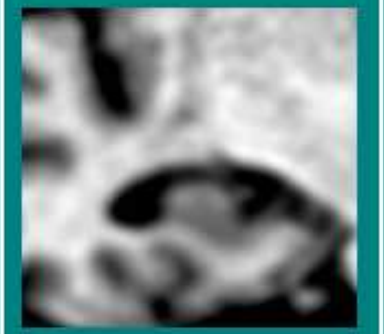
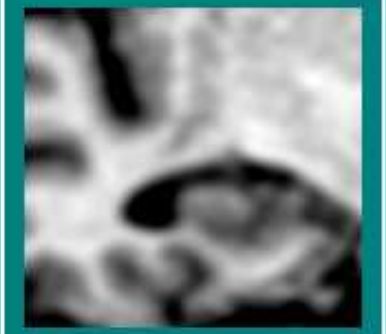
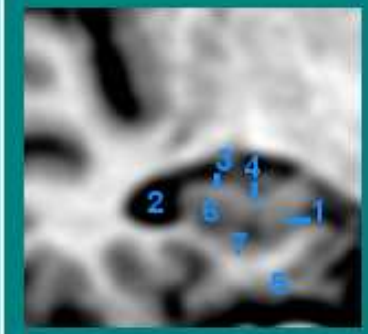
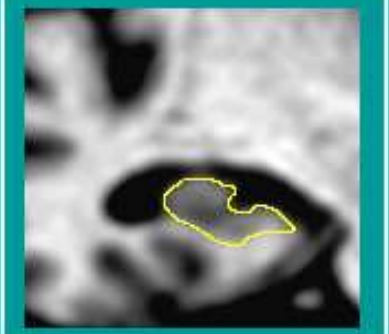
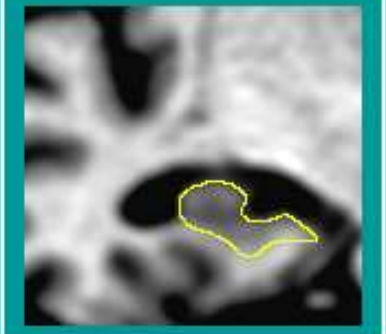
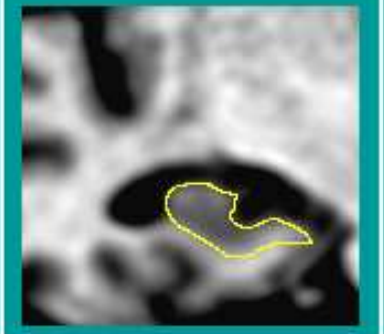
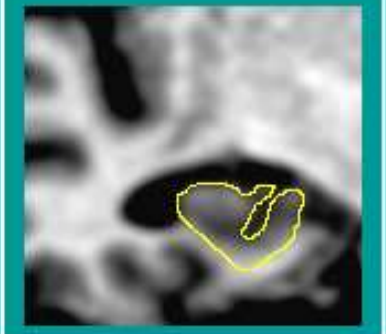
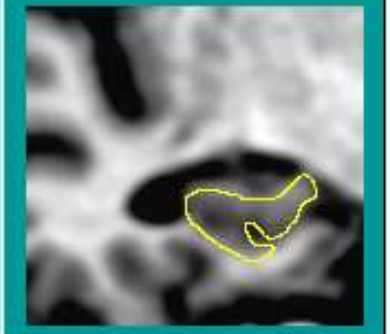
2B) AD

	108	107	106	105	104
Anatomical section					
Native MRI					
Tracing					
Notes					

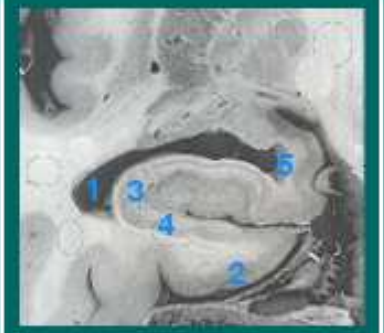
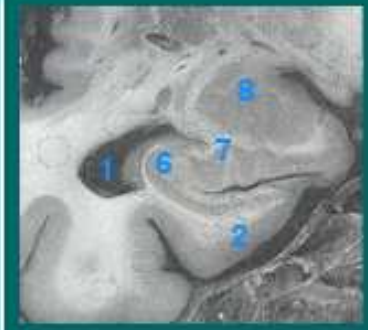
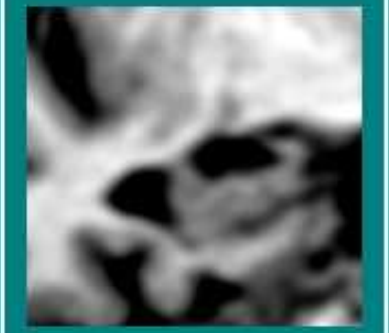
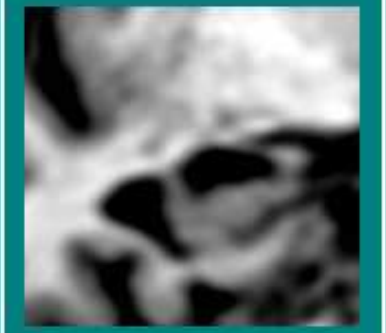
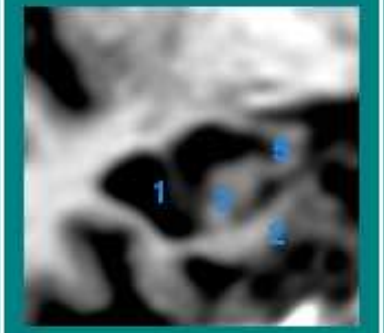
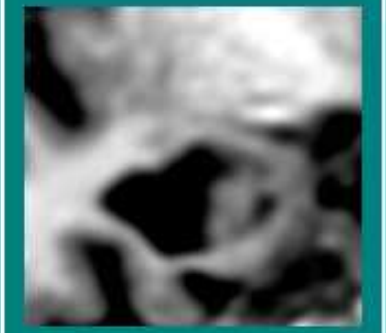
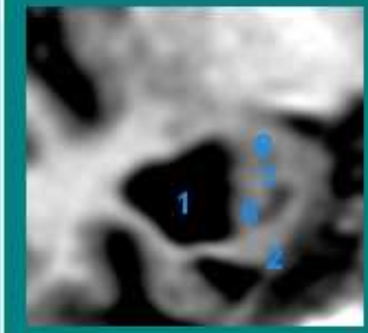
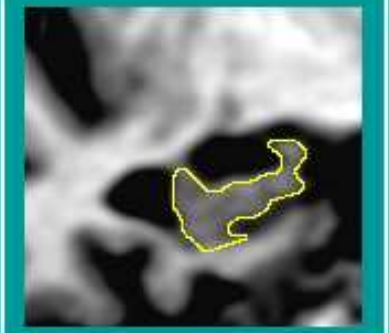
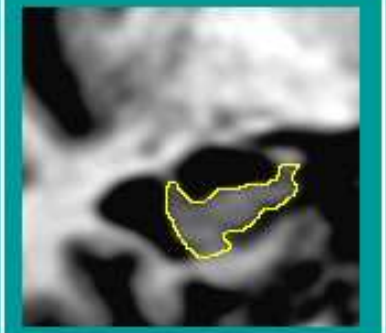
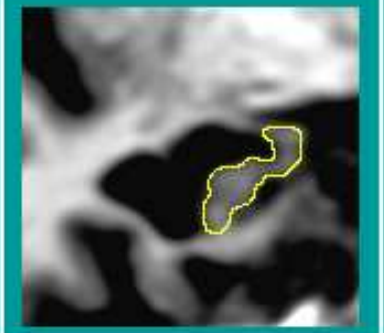
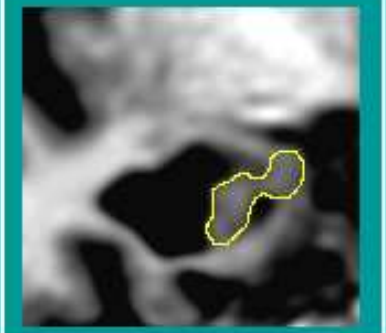
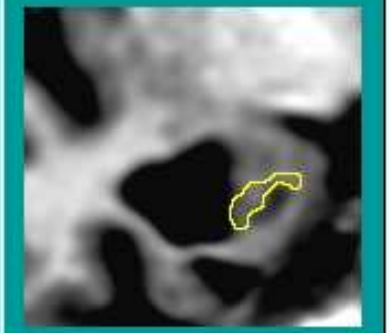
2B) AD

	103	102	101	100	99
Anatomical section					
Native MRI					
Tracing					
Notes			1=lateral ventricle 2= parahippocampal gyrus 3=fimbria (not included) 4=gyrus dentatus 5=subiculum 6=ambient cistern		

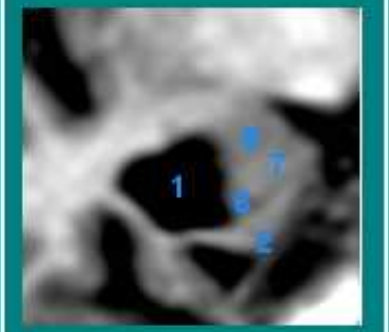
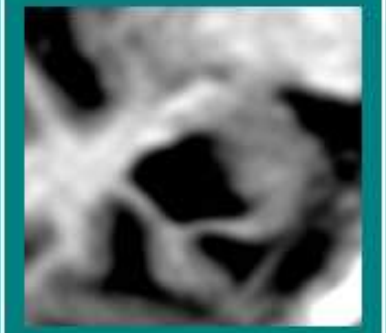
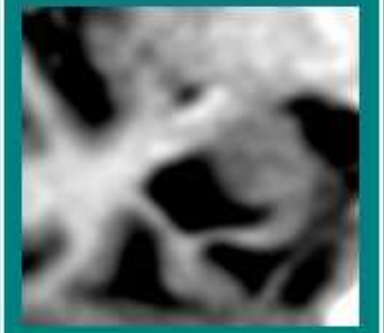
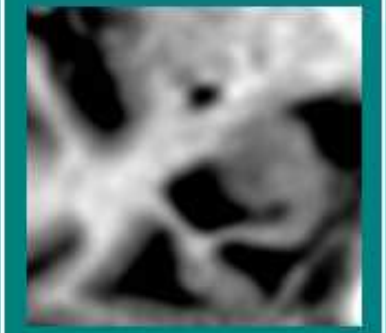
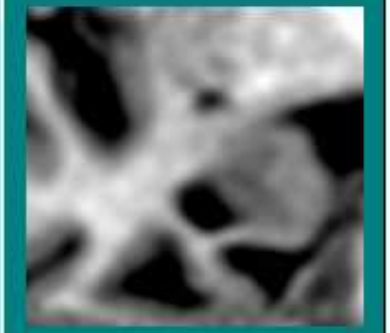
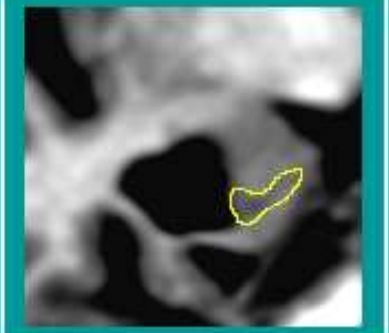
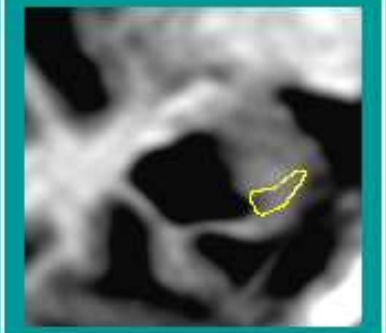
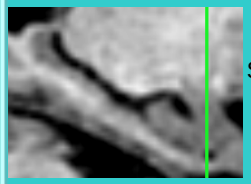
2B) AD

	98	97	96	95	94
Anatomical section					
Native MRI					
Tracing					
Notes					1=uncal sulcus 2=lateral ventricle 3=alveus 4=fimbria 5=parahippocampal gyrus 6=gyrus dentatus 7=subiculum

2B) AD

	88	87	86	85	84
Anatomical section					
Native MRI					
Tracing					
Notes			1=lateral ventricle 2=parahippocampal gyrus 3=cornu Ammonis 4=subiculum 5=vertical digitation		1=lateral ventricle 2=parahippocampal gyrus 6=hippocampal head 7=alveus 8=Amygdala

2B) AD

	83	82	81	80	79
Anatomical section					
Native MRI					
Tracing					
Notes	1=lateral ventricle 2=parahippocampal gyrus 6=hippocampal head 7=alveus 8=Amygdala	**Most anterior slice:** the separation of amygdala and hippocampal head was facilitated by sagittal and transverse views  Sagittal view			