

Hippocampal Dysfunction in Psychotic Disorders

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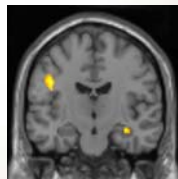
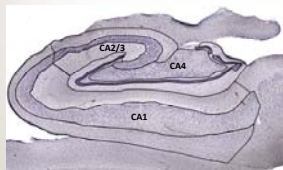
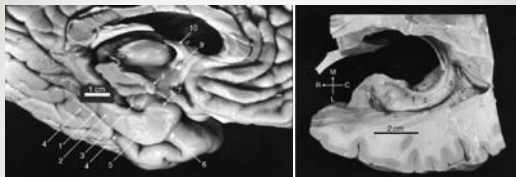
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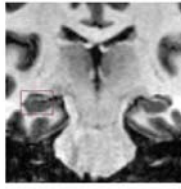
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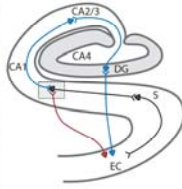
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Mapping hippocampal circuitry

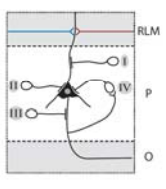
A



B



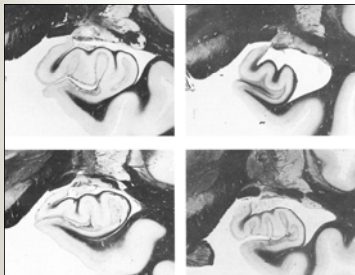
C

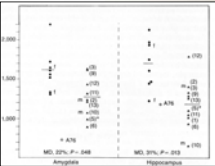


Heckers and Konradi, 2010

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Hippocampal volume in schizophrenia





Bogerts et al., 1985

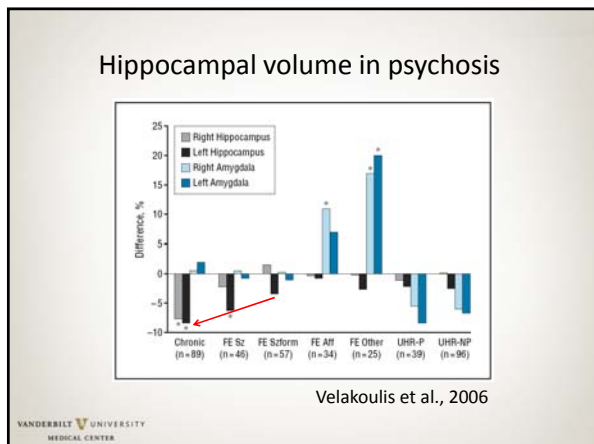
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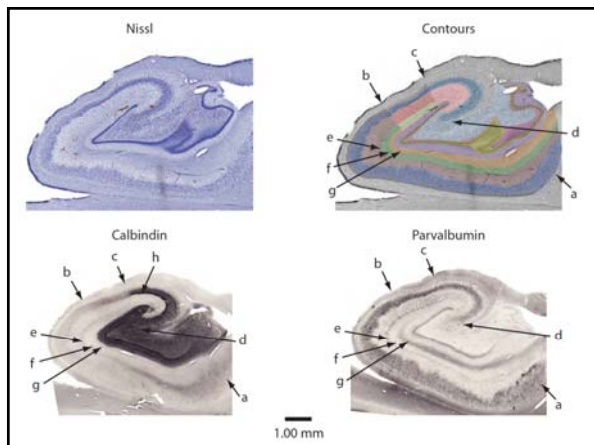
Hippocampal volume in schizophrenia

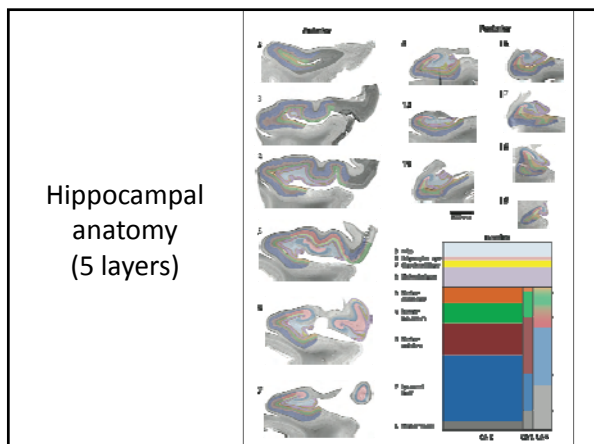
Meta-Analysis (Author,Year)	Number of Studies Included	Sample Size		Patients' Illness Duration (First Episode, Chronic, or Mixed)	Effect Size for Right Hippocampus (FValue of Significance)	Effect Size for Left Hippocampus (FValue of Significance)
		Patients	Healthy Control Participants			
Present meta-analysis	44	1669	2130	Mixed	-0.53 (<.00001)	-0.48 (<.00001)
	13	388	562	First episode	-0.56 (<.00001)	-0.60 (<.00001)
	22	739	896	Chronic	-0.65 (<.00001)	-0.58 (.002)
Nelson and others (1998)	17	498	412	Mixed	0.39* (<.001)	0.37* (<.001)
Wright and others (2000)	24	677	621	Mixed	-0.38 (<.01)	-0.42 (<.01)
Steen and others (2006)	10	300	287	First episode	Hippocampal volume deficit in patients is about 8% (<.0001)	
Vita and others (2006)	6	187	268	First episode	0.47* (.000)	0.66* (.000)

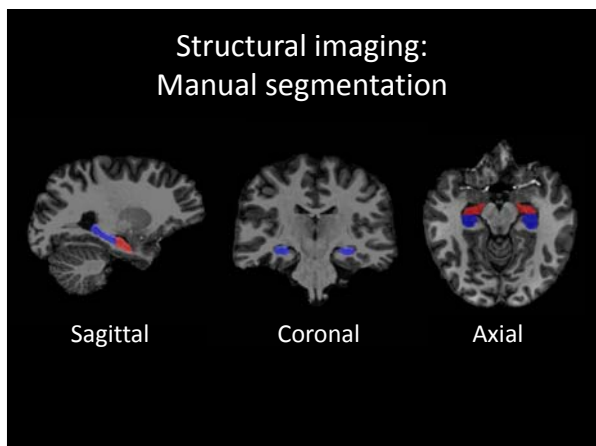
Meta-analysis of 44 ROI studies Adriano et al., 2012

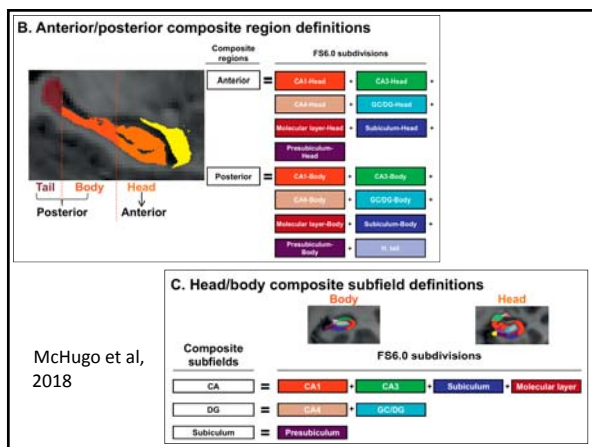
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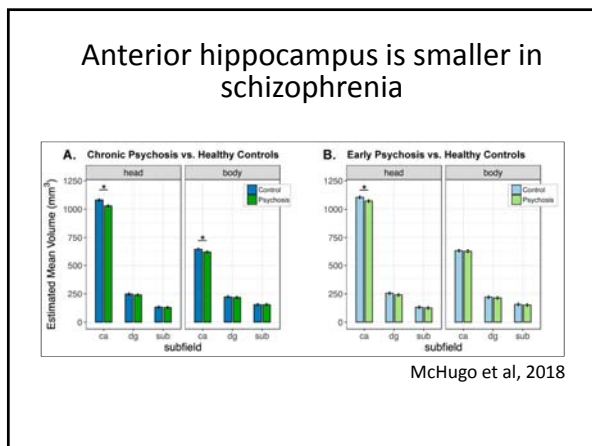












Mapping hippocampal circuitry

The diagram is divided into three parts: A, B, and C. Part A shows a coronal MRI slice of the brain with a box highlighting the hippocampal region. Part B is a schematic of the hippocampal circuitry, showing the CA1, CA2/3, CA4, DG, S, Y, and EC regions with their respective connections. Part C is a schematic of the hippocampal layers, showing the RLM, P, and O layers with their respective connections.

Heckers and Konradi, 2010

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Hippocampal cell number in schizophrenia

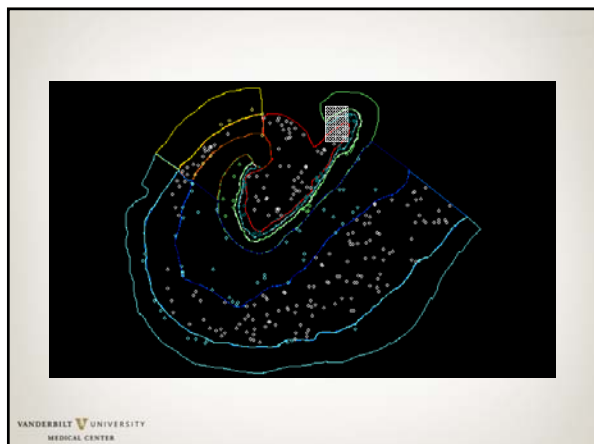
Part A is a micrograph of a hippocampal section with a 1 mm scale bar. The legend indicates: CA2/3 int. stratum, CA2/3 str. granulosum, CA2/3 stratum, CA1 str. granulosum, CA1 stratum, CA1 str. oriens, and CA1 str. radiatum. Part B, C, and D are bar graphs showing the number of cells per mm² for CA2/3 int. stratum, CA2/3 str. granulosum, CA2/3 stratum, CA1 str. granulosum, CA1 stratum, CA1 str. oriens, and CA1 str. radiatum in schizophrenia patients compared to controls.

Konradi et al., 2011

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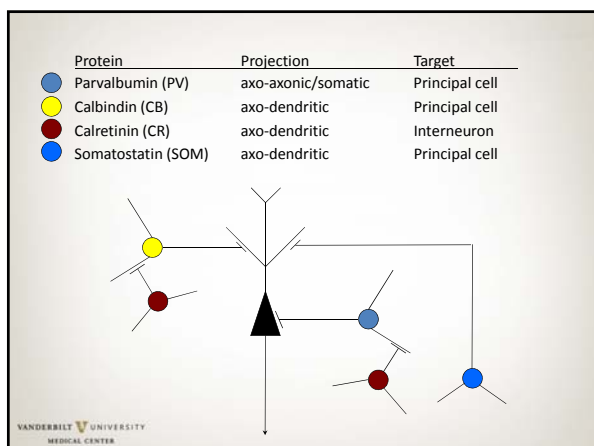
The image shows a fluorescence micrograph of a hippocampal section. The CA1 region is outlined in green and contains numerous blue fluorescent cells. The CA2/3 region is outlined in red and contains numerous red fluorescent cells. The CA4 region is outlined in yellow and contains numerous yellow fluorescent cells. The CA1 stratum radiatum is outlined in cyan and contains numerous cyan fluorescent cells.

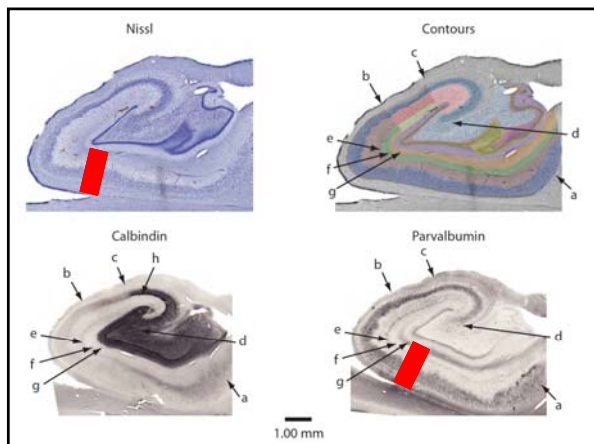
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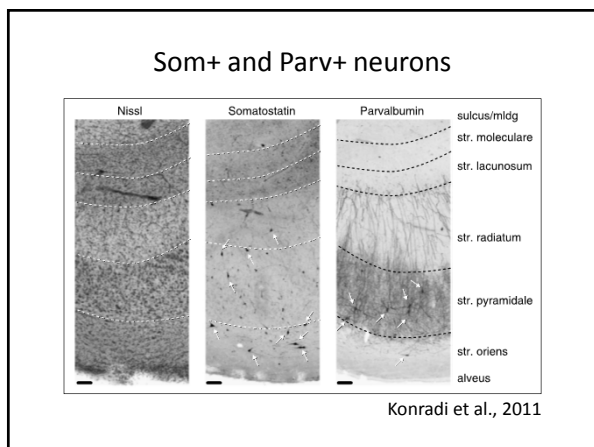


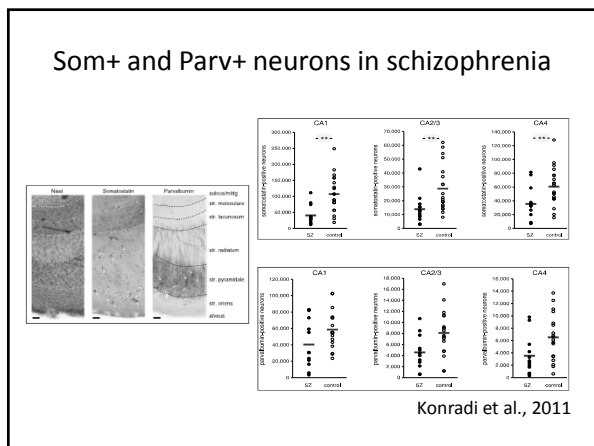
GAD65 mRNA expression (ISH)

Heckers et al, 2002



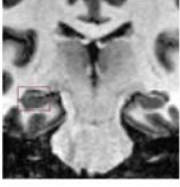




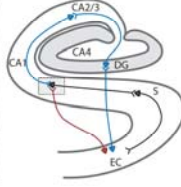


Mapping hippocampal circuitry

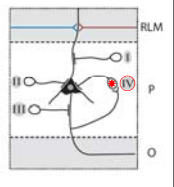
A



B




C




Heckers and Konradi, 2010

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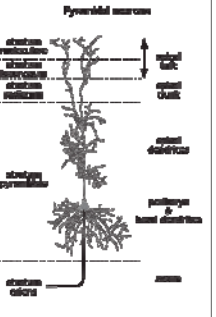
Parvalbumin



Somatostatin

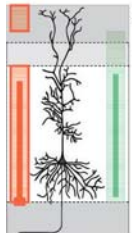


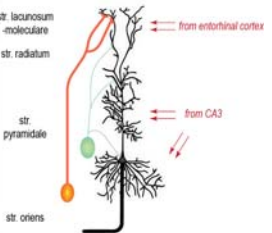
Pyramidal neurons



Heckers and Konradi, 2014

Altered E/I Balance in the Hippocampus

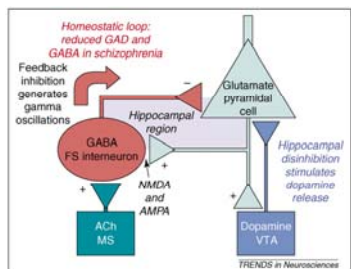




■ cell bodies } somatostatin
■ fibers }
■ cell bodies } parvalbumin
■ fibers }

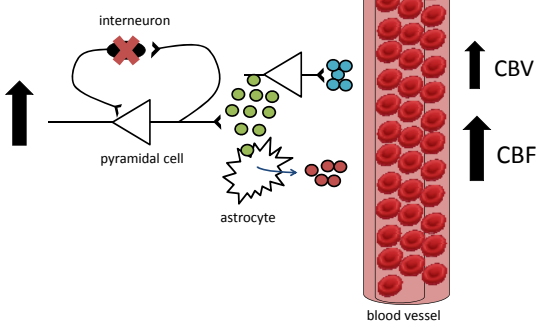
Heckers and Konradi, 2014

Hippocampal dysfunction in psychosis

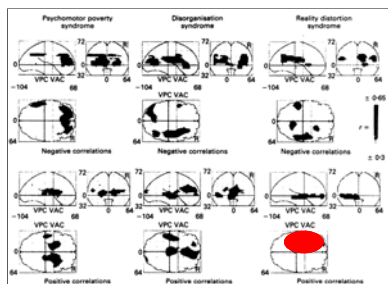


Lisman et al., 2008

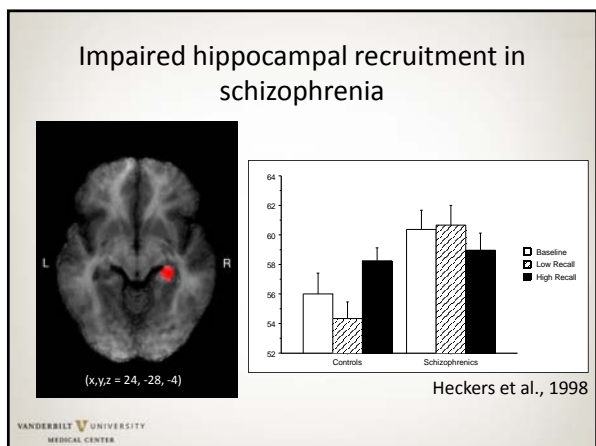
E/I Imbalance and Hippocampal CBF & CBV

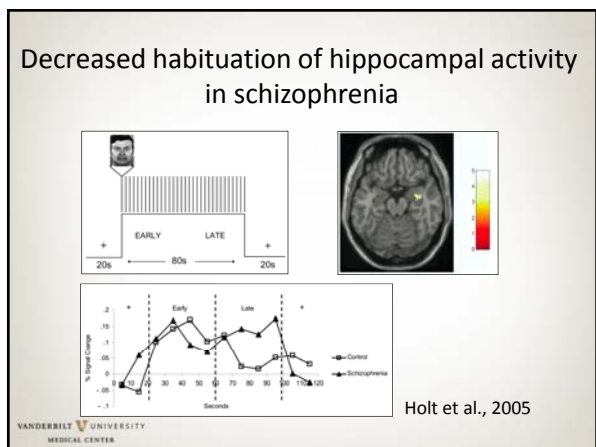


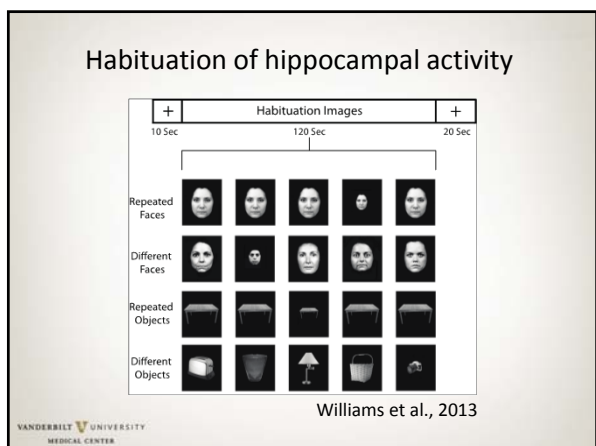
Increased Left MTL rCBF

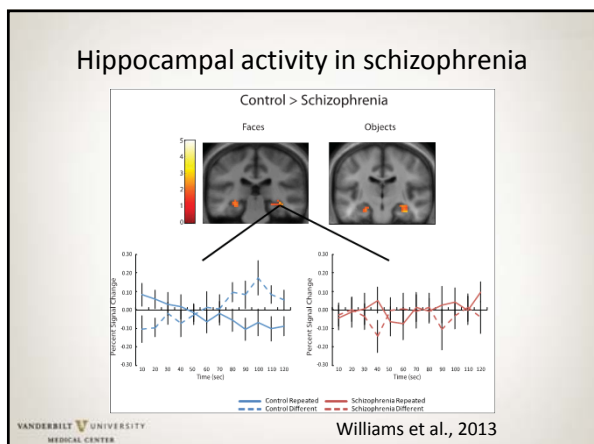


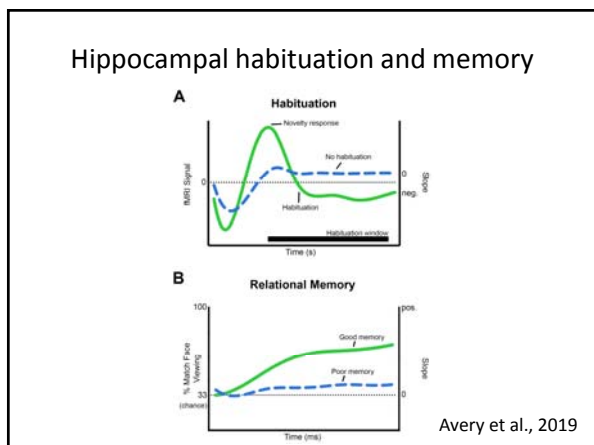
30 schizophrenia subjects
Liddle et al., 1992

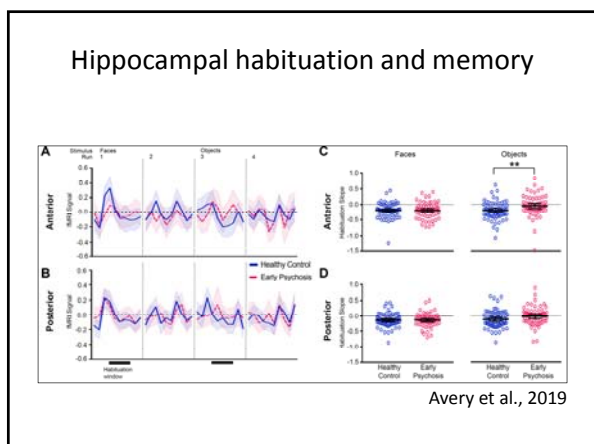




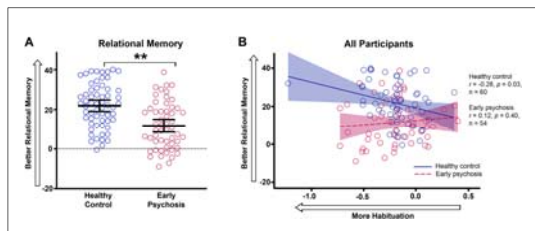






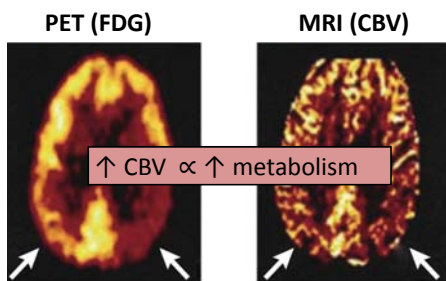


Hippocampal habituation and memory



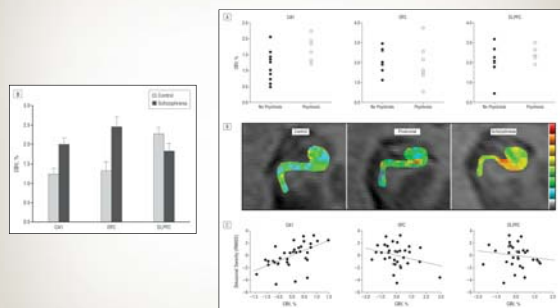
Avery et al., 2019

Cerebral blood volume maps are a measure of basal metabolism

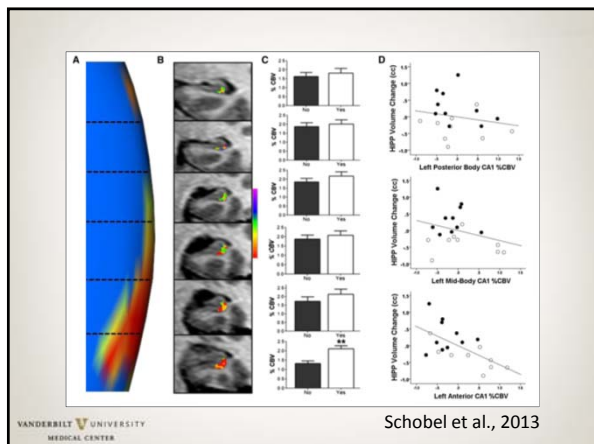


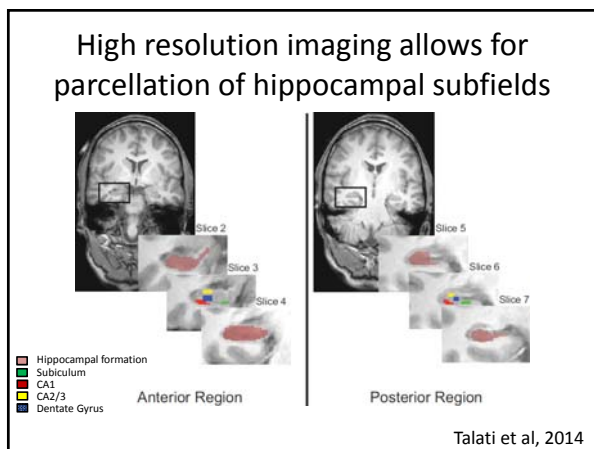
Small et al., 2011

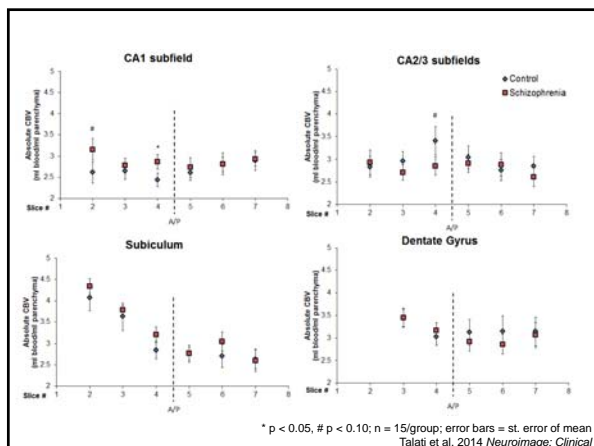
Increased CBV in CA1 in schizophrenia

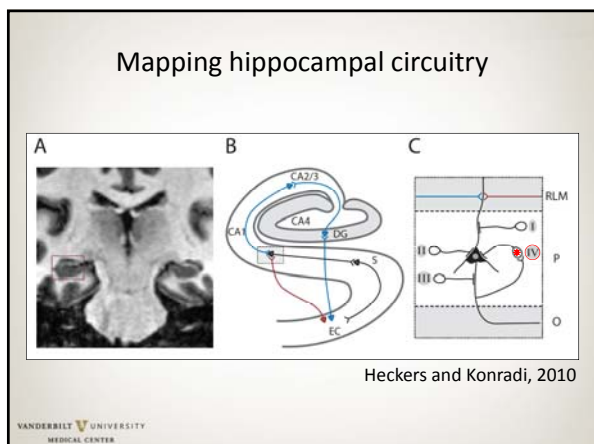


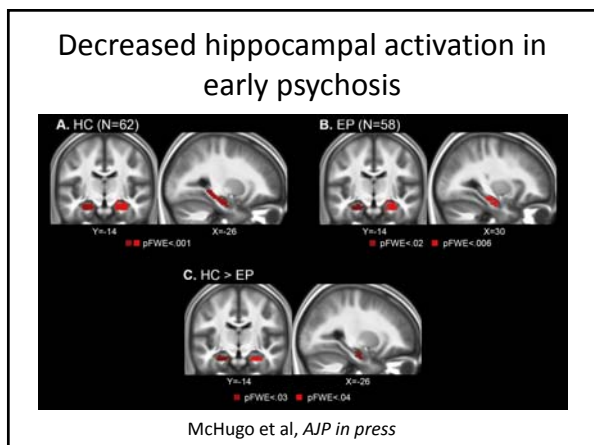
Schobel et al., 2009

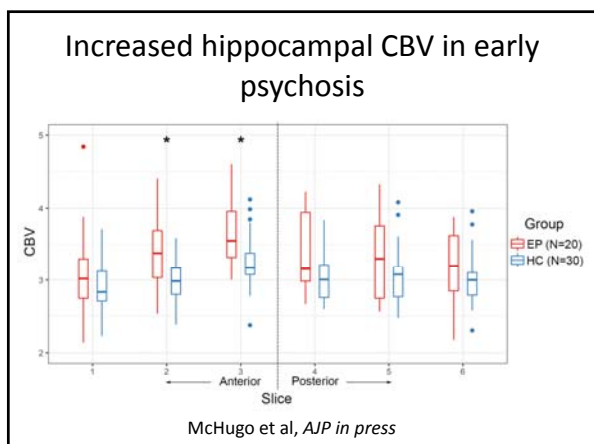


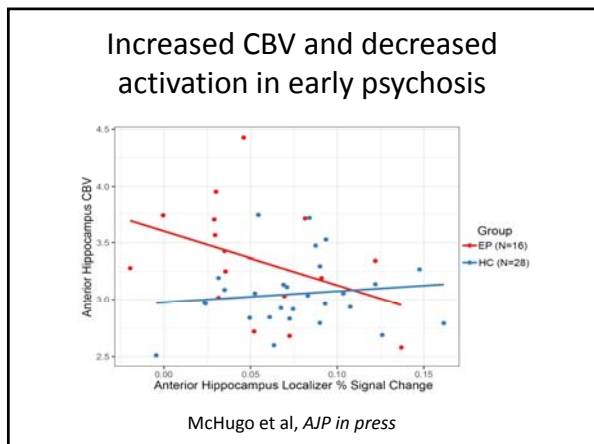


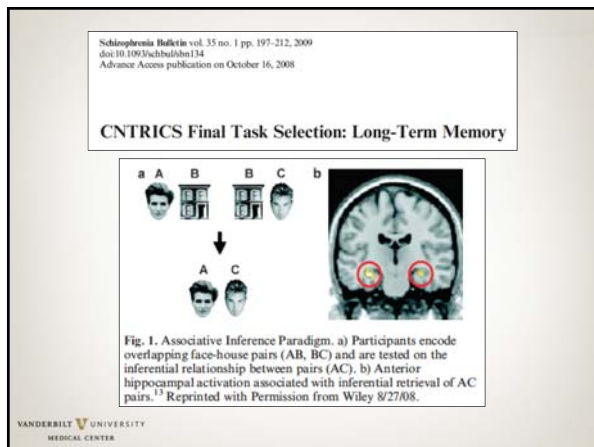


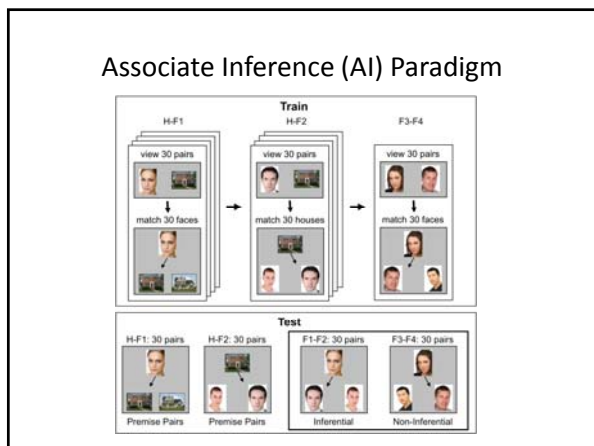


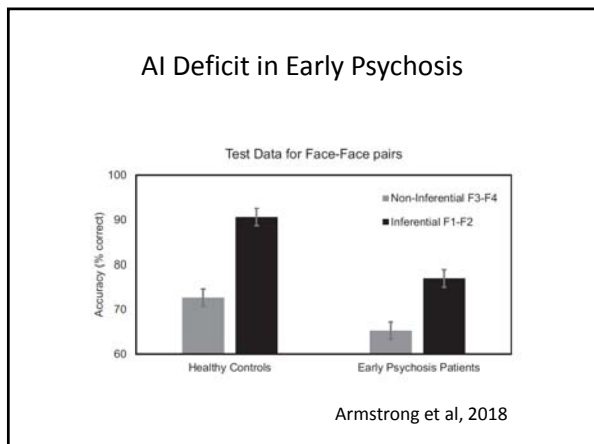


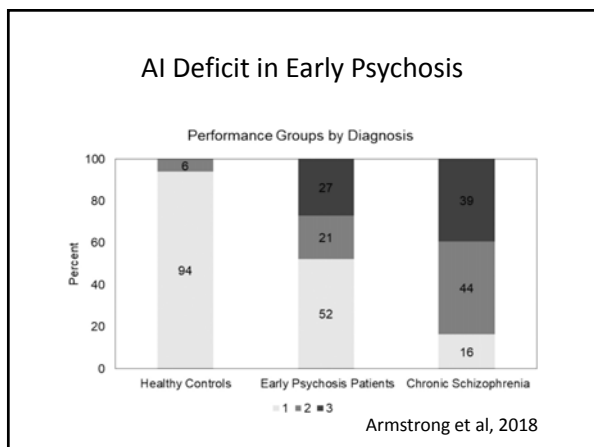


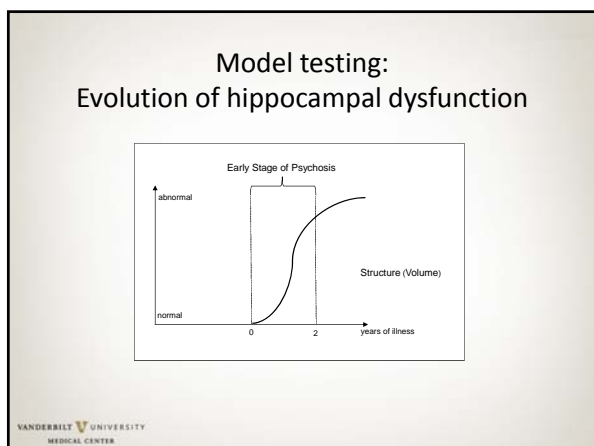




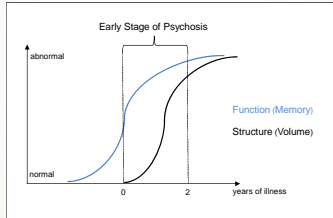






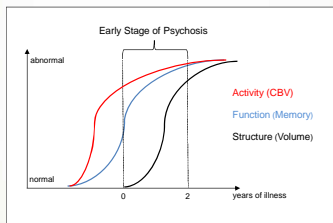


Model testing: Evolution of hippocampal dysfunction



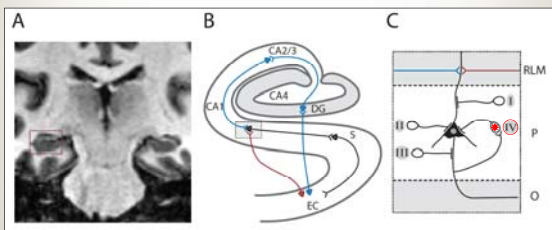
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Model testing: Evolution of hippocampal dysfunction



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Mapping hippocampal circuitry



Heckers and Konradi, 2010

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