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SP.236 / ESG.SP236 Exploring Pharmacology
Spring 2009

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Today's Plan

- Finishing drug chart
- Discussing drug laws
- Schizophrenia
- Psychedelics and other psychotomimetics

Where were we on the drug chart?

Homework

- Assigning presentation dates
- Comment on the blog, pharmacology.mit.edu
- Review the recreational drugs chart, make sure you have some familiarity with the drug classes “Sedatives” through “Inhalants”. Memorize one example of each, and roughly what it does. Don’t worry about “Other”.

Discussion: Drug Laws

What do you know about drug laws?

Discussion: Drug Laws

Should marijuana be legal?

Discussion: Drug Laws

Should marijuana possession just warrant a ticket,
like it does now in Massachusetts?

Discussion: Drug Laws

Should medical marijuana be legal?

Discussion: Drug Laws

Agonist substitution?
Methadone clinics?
Heroin clinics?

Discussion: Drug Laws

Should salvia be illegal?

Discussion: Drug Laws

Should alcohol be illegal?

Discussion: Drug Laws

Should we lower the drinking age to 18?

Discussion: Drug Laws

Is it good that we keep pseudoephedrine cold medicines behind the counter?

Discussion: Drug Laws

Should there be any legal access at all to mind-expanding or recreational drugs, like psychedelics?
What about heroin?

What is psychosis?

What is schizophrenia?

What else causes psychosis?

- Full blown mania in Bipolar Disorder - Type I
- Drugs
- Alzheimer's and other types of dementia

Circuits in the brain

Some circuits in the brain are well understood.

What circuit have I showed you before?

Hint: It involved one region sending axons to a second region and releasing a specific neurotransmitter to send a certain message.

Key



Increases/causes OR excitatory (synapse)

Note: An arrow from one brain region to another is glutamate, unless otherwise noted



Decreases/blocks OR inhibitory (synapse)

Note: A T-headed arrow from one brain region to another is GABA, unless otherwise noted



Modulates

The relationship may be complex and/or poorly understood

Entity

A brain region, cell, protein, or other entity

Entity

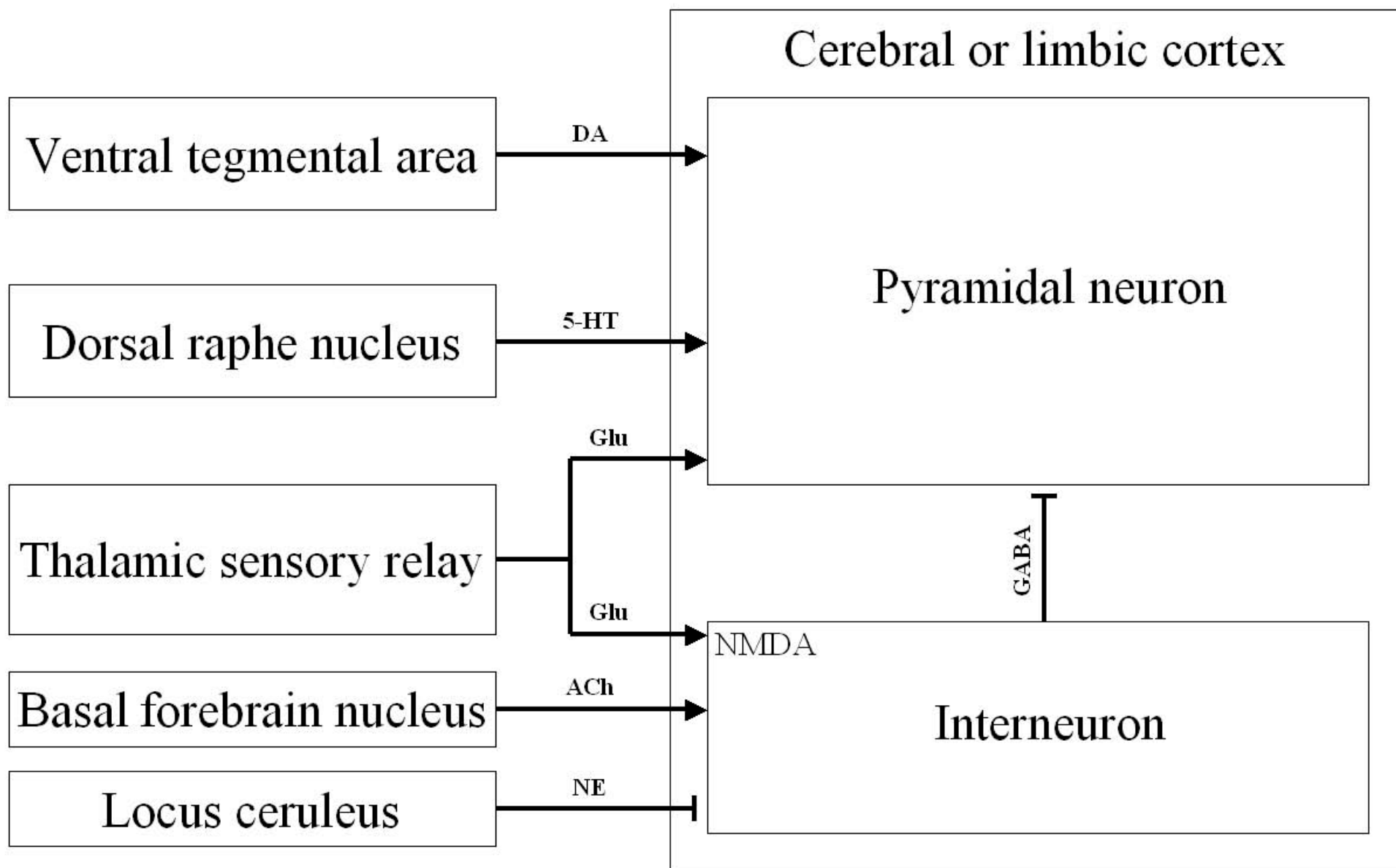
Hypoactive, decreased, or dead

Entity

Hyperactive, increased

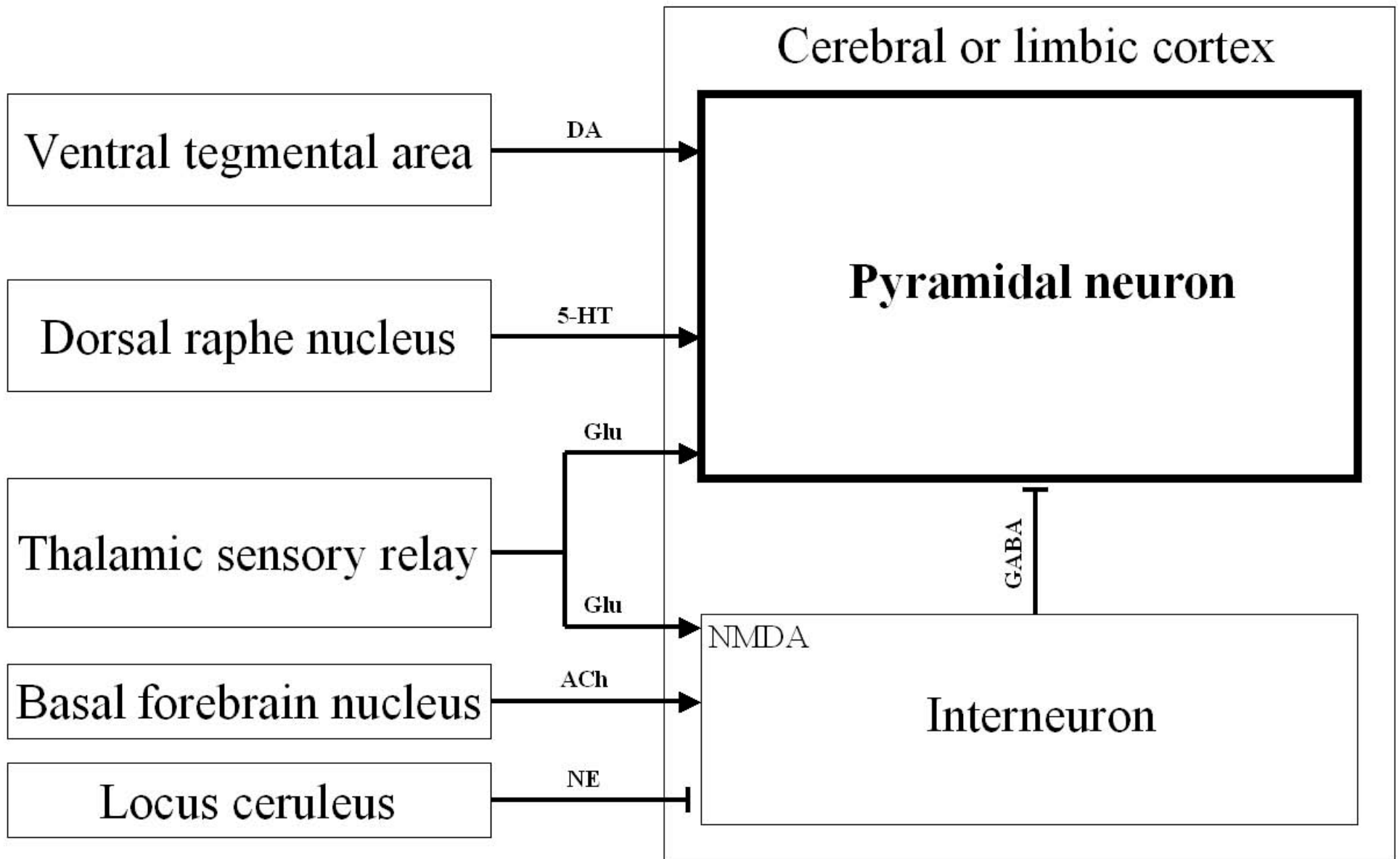
Schizophrenia

This diagram shows the pathways that may be involved in schizophrenia.



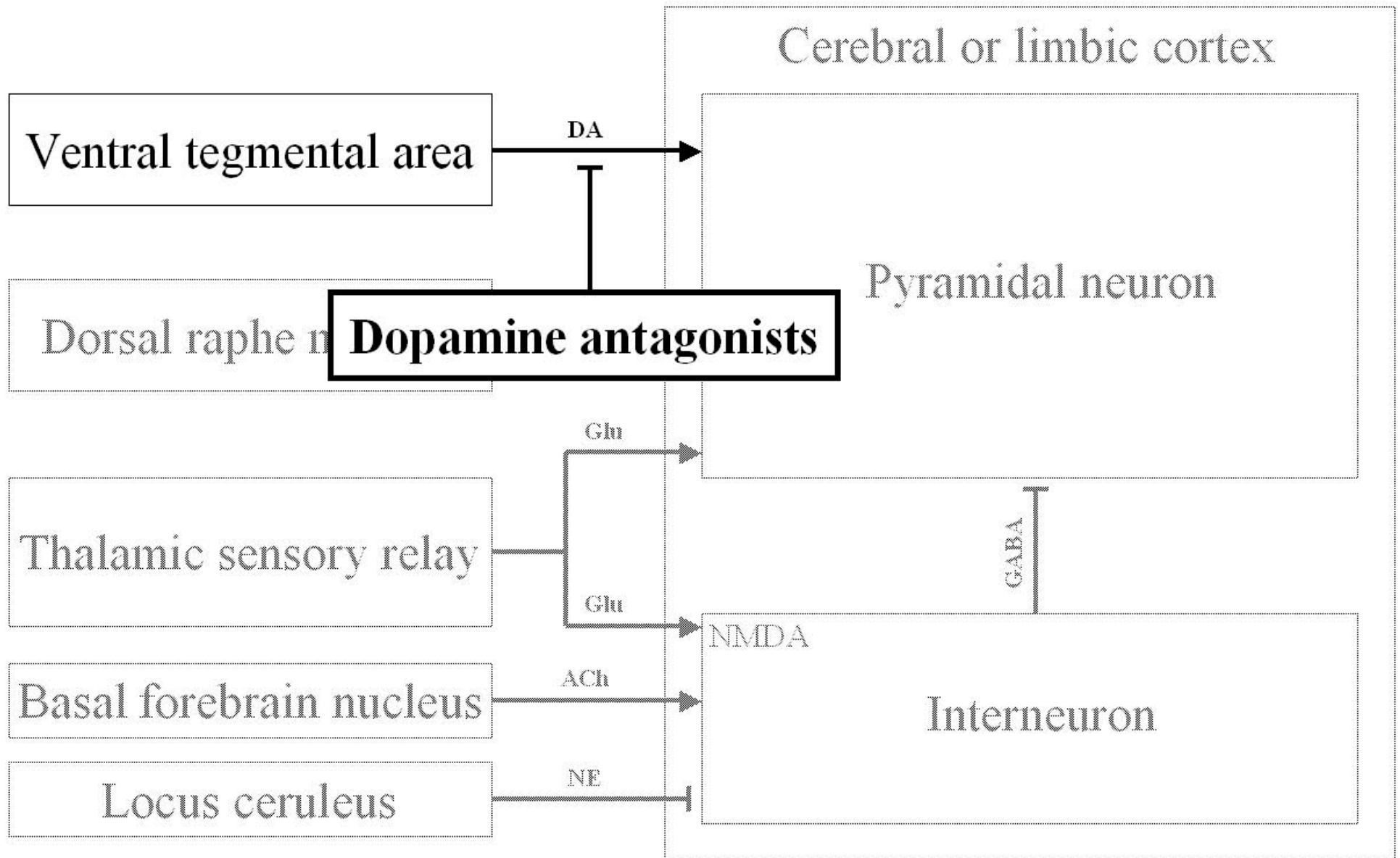
Schizophrenia

Psychosis results when the pyramidal neurons are overly excited and fire too often.



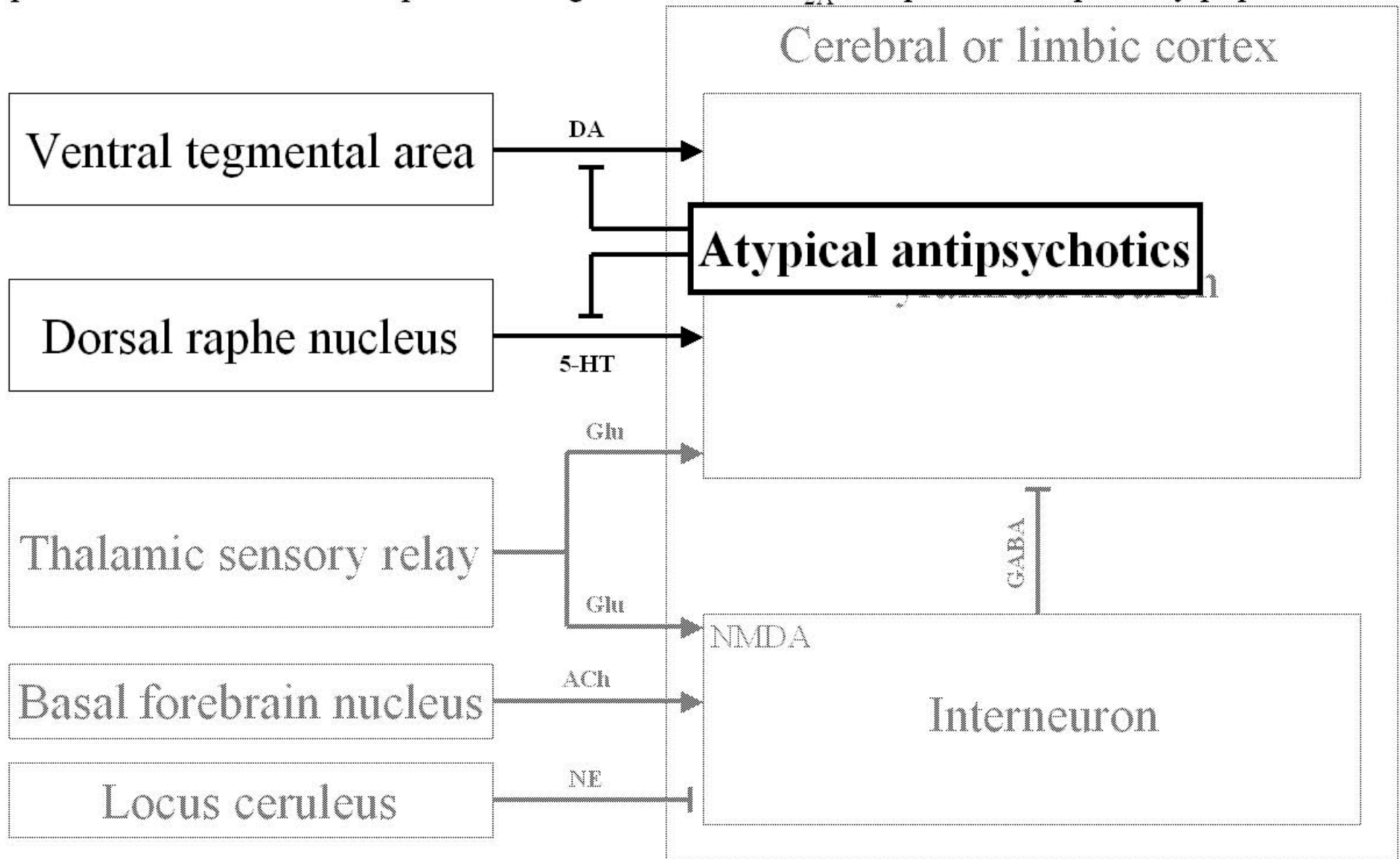
Antipsychotics

Typical antipsychotics, also called neuroleptics, are antagonists at dopamine receptors

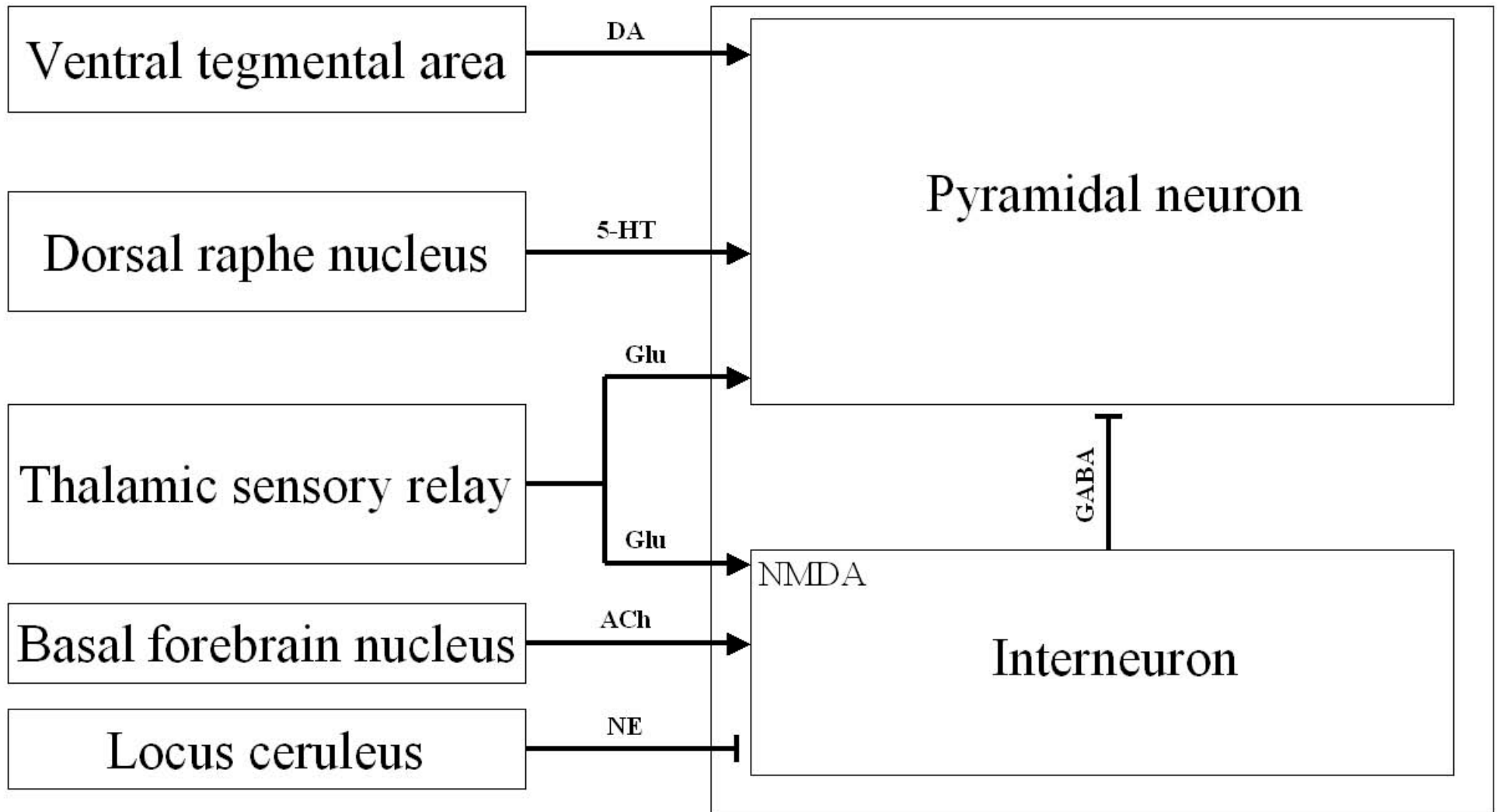


Atypical antipsychotics

Atypical antipsychotics (second-generation antipsychotics) are often antagonists at both dopamine and serotonin receptors. Antagonists of 5-HT_{2A} receptors are especially popular.

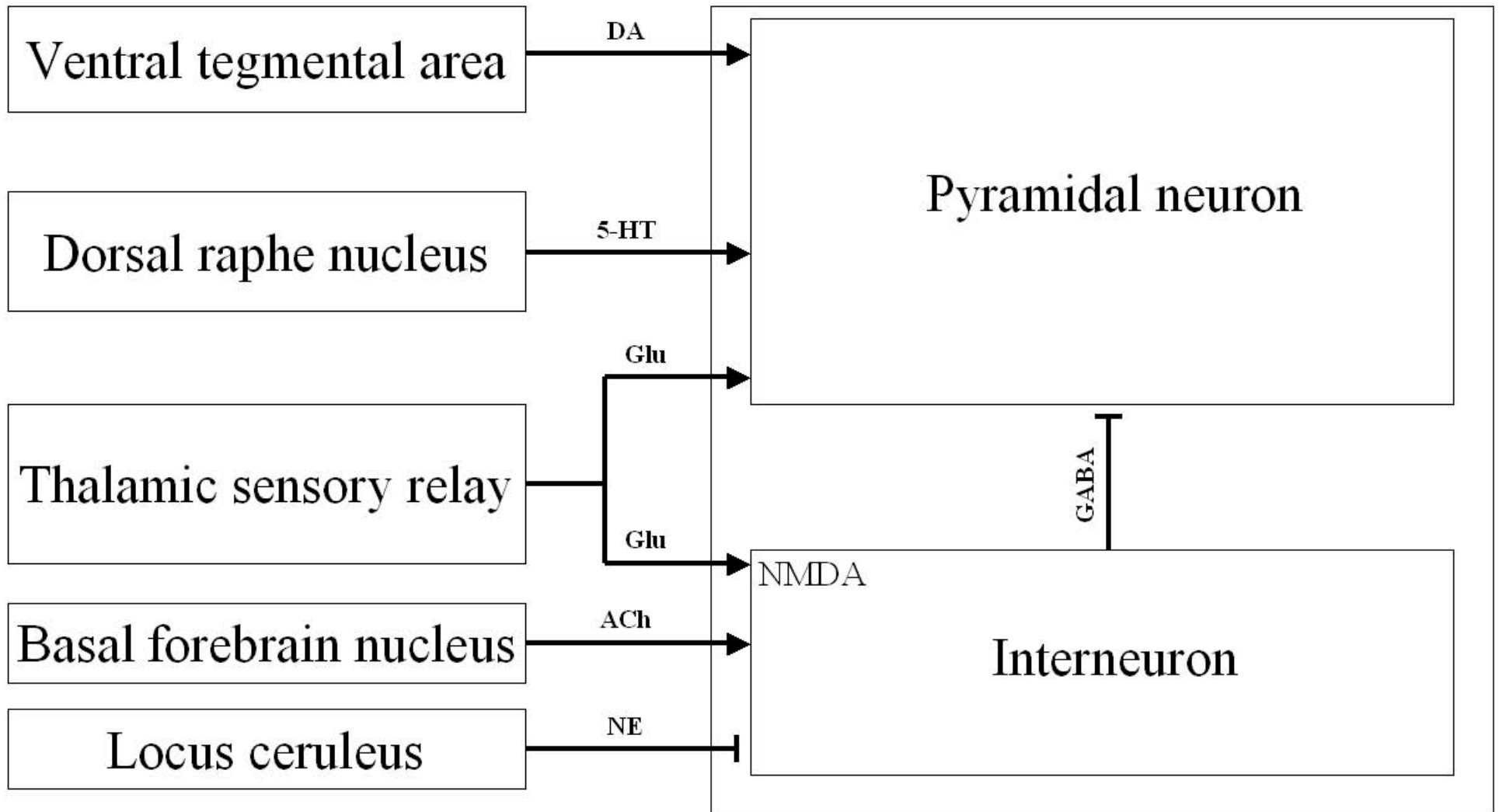


Psychotomimetics: Drugs that induce psychosis, or “mimic” the symptoms of psychosis. What drugs might do that? See drug chart and neurotransmitters chart.



Psychotomimetics

Psychotomimetics are drugs that cause psychosis. Drugs that increase 5-HT, DA, and/or NE are all psychotomimetics (amphetamine, cocaine, psychedelics). Drugs that block NMDA receptors (ketamine, PCP, dextromethorphan) and drugs that block muscarinic ACh receptors (anticholinergics) are also psychotomimetic.



Other psychosis treatments

- Benzodiazepines, which boost the inhibitory effect of GABA, can effectively suppress psychosis. (This was predicted by the diagram.)
- Clozapine increases ACh release, which helps alleviate psychosis (as predicted).
- Many antipsychotics block NE, which further helps treat psychosis.