

# Neurotransmitters & Their Role in Health



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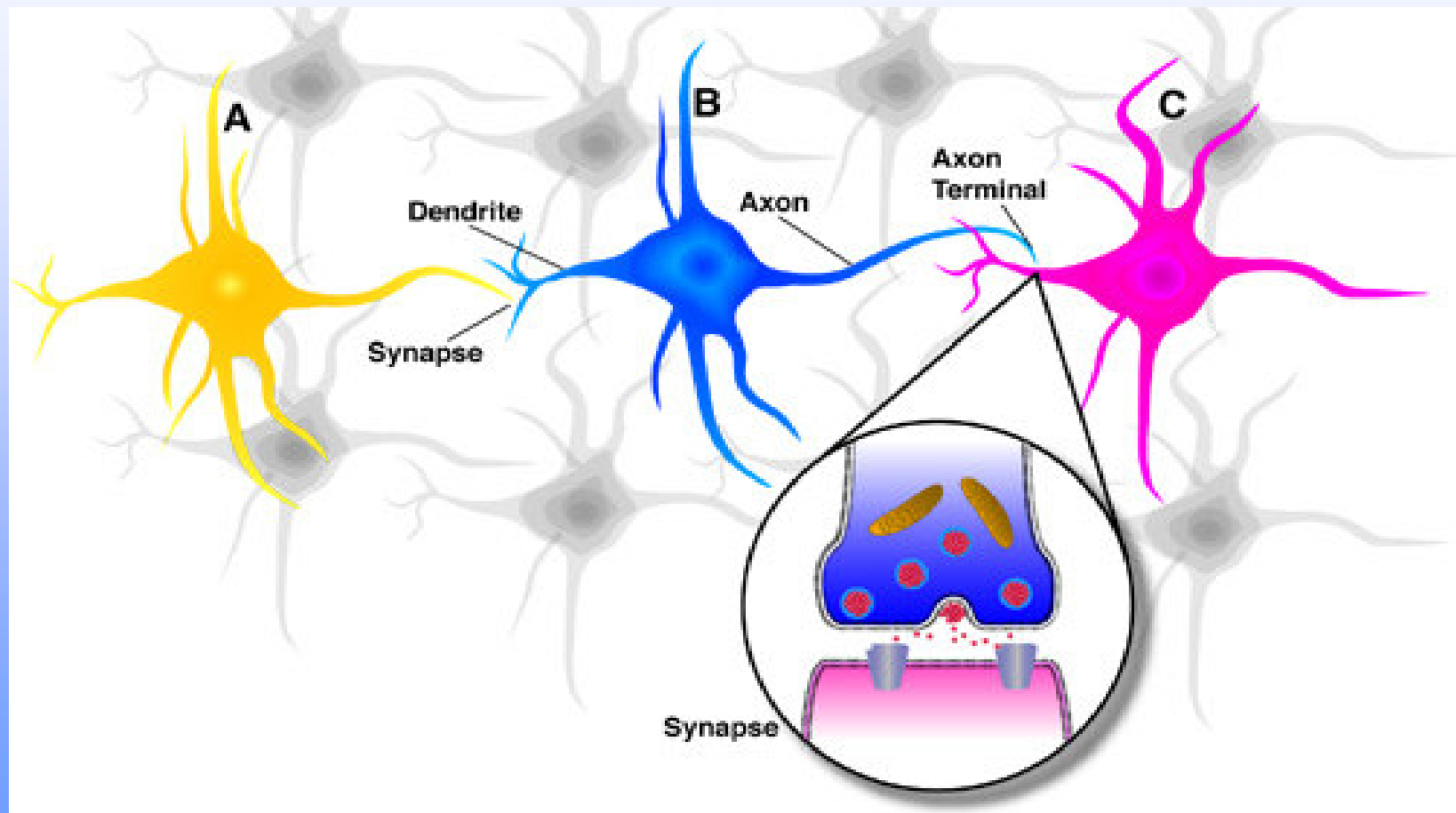
# New Hampshire Natural Health Clinic



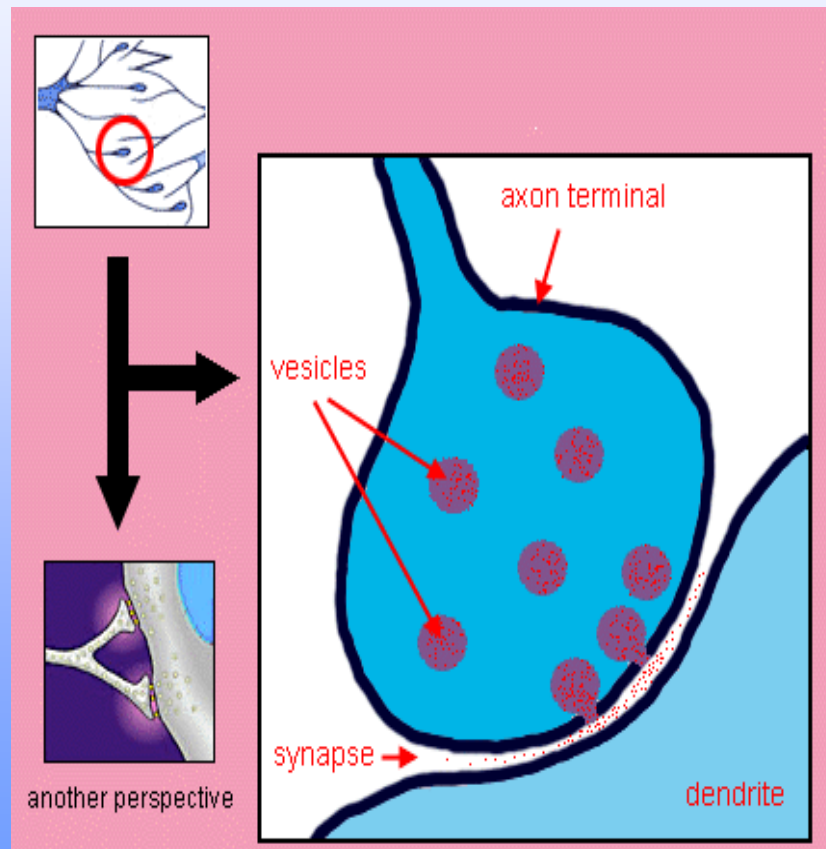
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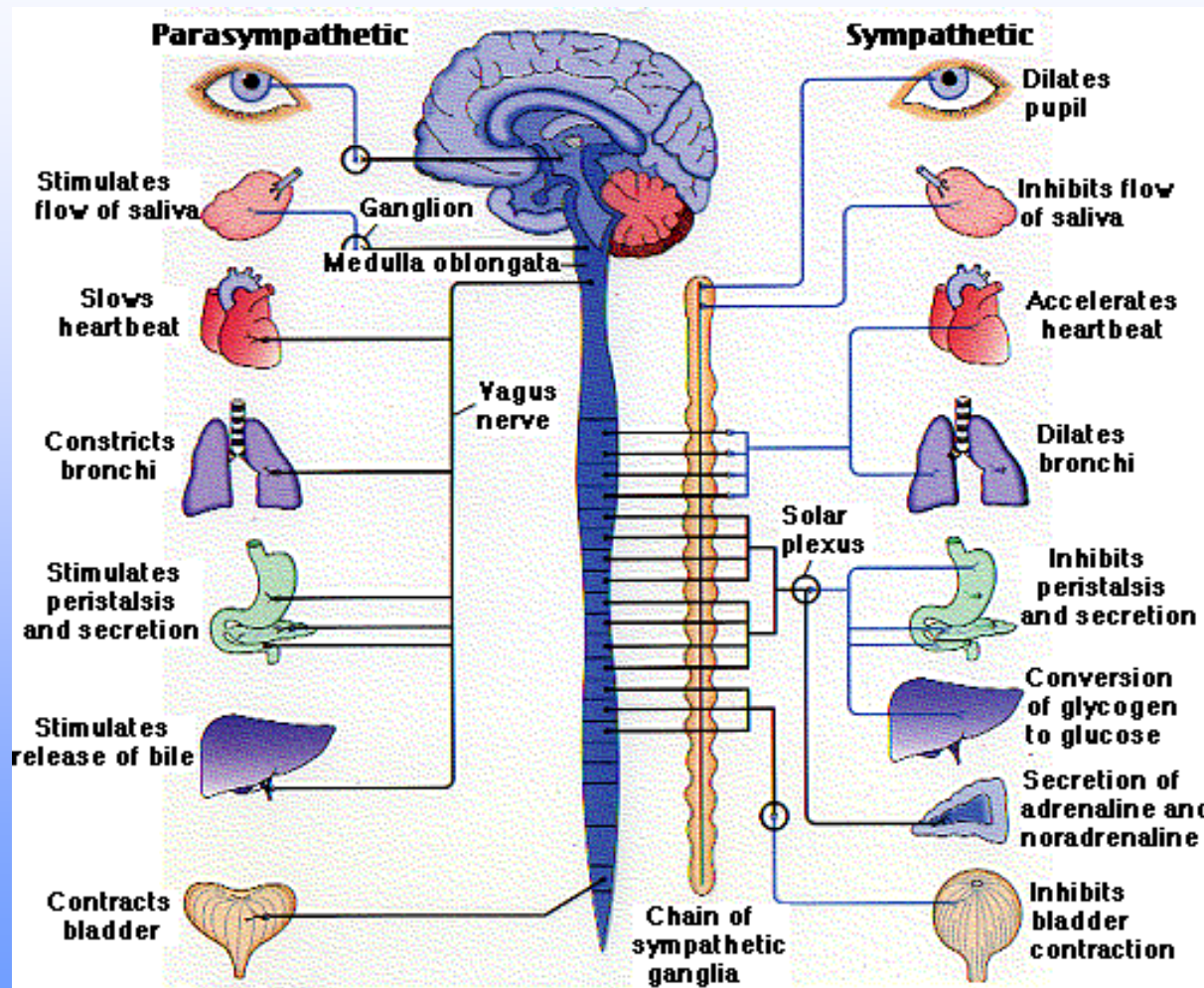
# Neuron Structure



# Neurotransmitter Storage Sites in the Neuron



# Autonomic Nervous System



# Neuron Function

- **A neuron has two functions:**
  - **Excitability** (the ability to receive input- listening)
    - Receptor function
  - **Conductivity** (the ability generate output- talking)
    - Neurotransmitter supply



# Neuron Function

- A healthy nervous system requires neurons to *talk* to each other...*at the proper “volume”*



# Simply Stated...

- Neurotransmitter-related conditions are linked to:



– Uncontrolled neuron activity- *too much neurotransmitter* (talking too loud)



– Lack of neuron activity- *not enough neurotransmitter* (talking too soft)

# Excitatory/Inhibitory Concept

- All neurotransmitters are considered either excitatory or inhibitory.

*Biochemically:*

- Excitatory NT's continue the chain of communication- the “*screamers*”
- Inhibitory NT's break the chain of communication- the “*hushers*”

# Excitatory/Inhibitory Concept

- All neurotransmitters are considered either excitatory or inhibitory.

*Clinically:*



- Excitatory NT's give energy, motivation, wakefulness



- Inhibitory NT's sedate, calm, induce sleep

# Excitatory/Inhibitory

- Inhibitory NT's

- GABA
- Serotonin
- Glycine
- Taurine
- Agmatine



- Excitatory NT's

- Glutamate
- Epinephrine
- Norepinephrine
- PEA
- Histamine
- Aspartic Acid
- Dopamine



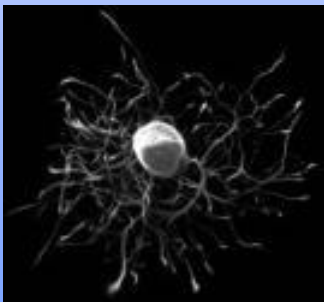
# Excitatory/Inhibitory Concept

- It is balance of excitatory and inhibitory neurotransmitter levels that determines one's health



# Neuronal Organization

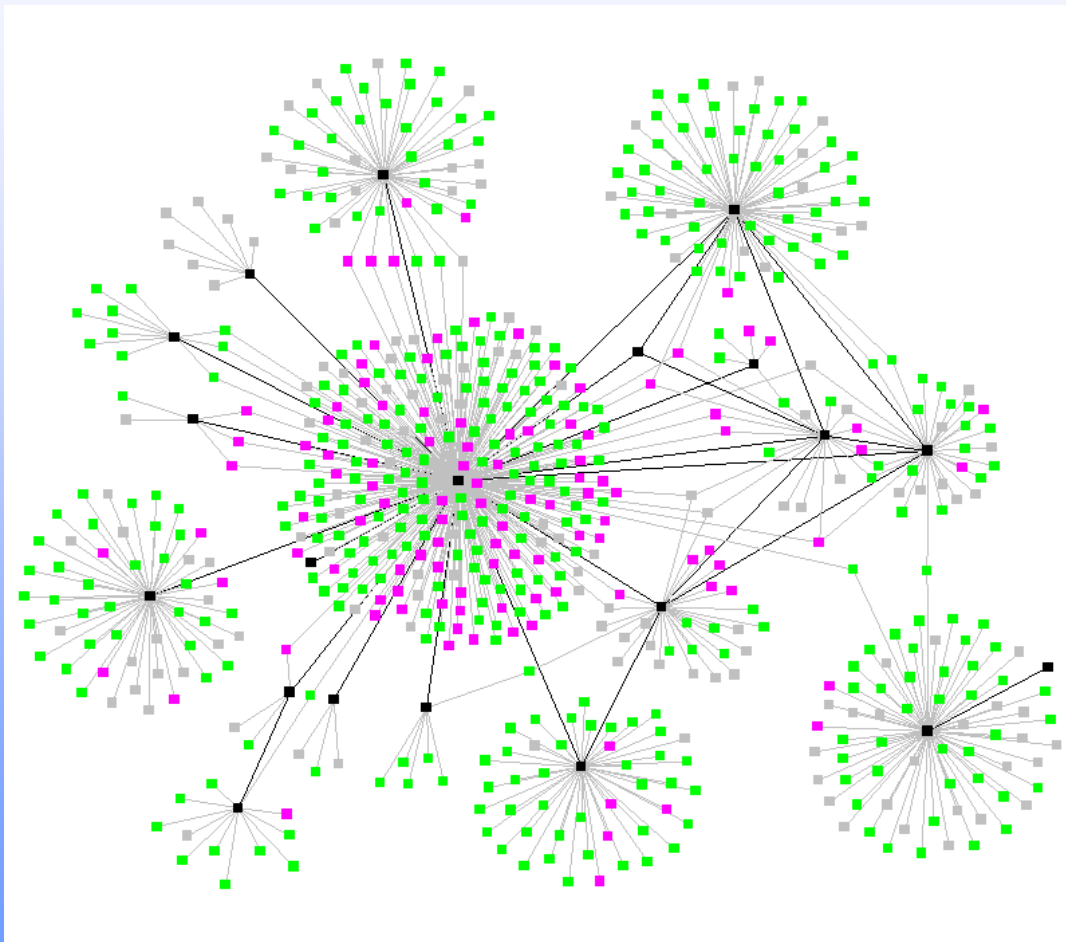
- How are the excitatory & inhibitory systems organized?



# The NT Network



# Neuronal Networks



- Clusters of neurons control specific functions in the body:
  - PEA neurons: cognition
  - Dopamine neurons: pleasure/reward
  - Histamine neurons: sleep/wake cycle
  - Serotonin neurons: project everywhere

What Does All This Mean in  
Terms of ME?!



# Neurotransmitters & Health

- Depression
- Insomnia
- Anxiety
- Fatigue
- Hyperactivity/ADD
- Appetite Control
- Fibromyalgia
- Migraines
- PMS
- Mood
- Autism
- OCD
- Addictions
- Bipolar

# Neurotransmitter Imbalance

- **A large portion of the population has multiple neurotransmitter imbalances**
  - *Neurotransmitters are too high*
  - *Neurotransmitters are too low*



# Where do Imbalances Come From?

- High levels of stress



- Poor dietary habits



- Environmental toxins



- Genetics



# Where do Imbalances Come From?

- Stressful lifestyles cause the body to lose neurotransmitters rapidly, which leads to very low levels over time.



# Where do Imbalances Come From?

- Poor dietary habits (fast-food, junk food, sugars, etc.) do not provide the body with the building blocks for neurotransmitters, called *amino acids*.



# Where do Imbalances Come From?

- Environmental toxins, such as industrial cleaners, air & water pollution, and solvents kill brain cells, which contain the neurotransmitters. Brain cells **CANNOT** be replaced!



# Where do Imbalances Come From?

- Some people have poor neurotransmitter levels due to their genetics.



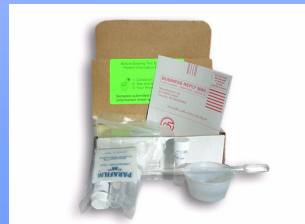
# How to Fix Imbalances

- Supplying the body with the proper NT building blocks allows the neurons to talk the way they should.
- Targeted Amino Acid Therapy



# Optimizing Communication

- How do you know which NT's to need balancing?
- Urinary Neurotransmitter testing



# Assessment of Neurotransmitters

- Urine contains all the neurotransmitters
- These neurotransmitters can be tested in a laboratory



Urinary Neurotransmitter  
Measurements are Well  
Documented in Scientific  
Literature

# Validity of Urinary NT's

Do urinary values correlate with various clinical conditions?

**YES!**

# Validity of Urinary NT's

- A study by Hernandez-Reif, et al. determined “the longer term massage effects included reduced depression and hostility and *increased urinary dopamine, serotonin values.*”

Hernandez-Reif M, Ironson G, Field T, Hurley J, Katz G, Diego M, Weiss S, Fletcher MA, Schanberg S, Kuhn C, Burman I. “Breast cancer patients have improved immune and neuroendocrine functions following massage therapy.” J Psychosom Res. 2004 Jul;57(1):45-52.

# Validity of Urinary NT's

Are urinary values representative of  
CNS levels?

**YES!**

# Validity of Urinary NT's

Administration of 5-Hydroxytryptophan to rats causes a parallel increase in:

## CNS

5-HTP ↑

Serotonin ↑

5-HIAA ↑

## Urine

5-HTP ↑

Serotonin ↑

5-HIAA ↑

# Why Test?

The patient results are compared to an optimal range and each other. Difficult to guess what is not in balance.

	Pt 1	Pt 2	Pt 3	Pt 4	Pt 5	Optimal Range
Epi	15.6	6.5	5.9	3.6	7.0	8-12
Nor	42.9	117.9	37.5	39.8	52.6	35-55
Dopa	168	205	478	150	171	125-175
Sero	95.2	124.1	136.2	153.3	82.7	175-225
GABA	3.5	5.3	8.2	7.4	2.1	2-4
PEA	298	174	150	956	302	150-350
Glut	11.0	21.4	33.9	15.6	58.4	10-25

# Importance to Testing

- Considerations:



- Which neurotransmitters are imbalanced?



- Is the transmitter excitatory or inhibitory?



- What about total excitatory/inhibitory balance?



- How does the imbalance relate to the symptoms?

# How to Fix a Patient

- Based on the previous considerations, a supplement program that specifically targets the imbalances is developed.

# Summary

- Neurotransmitters are a very important aspect of health
- Neurotransmitter imbalances play a role in many diseases
- Neurotransmitter imbalances are common in the general population

# Summary

- Identifying which neurotransmitters are imbalanced is the first step to optimal health.
- Supplying the body with the specific neurotransmitter building blocks it needs leads to improved clinical outcomes.

# New Hampshire Natural Health Clinic



Call for an appointment  
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