

Neurotransmitters and Speech

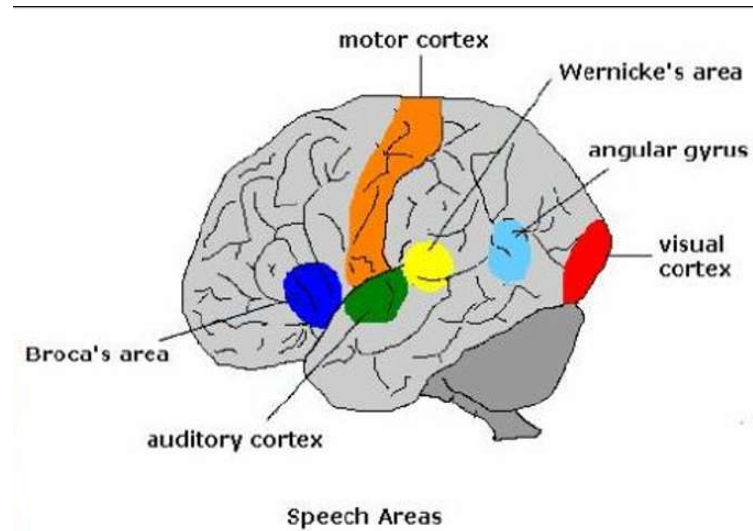
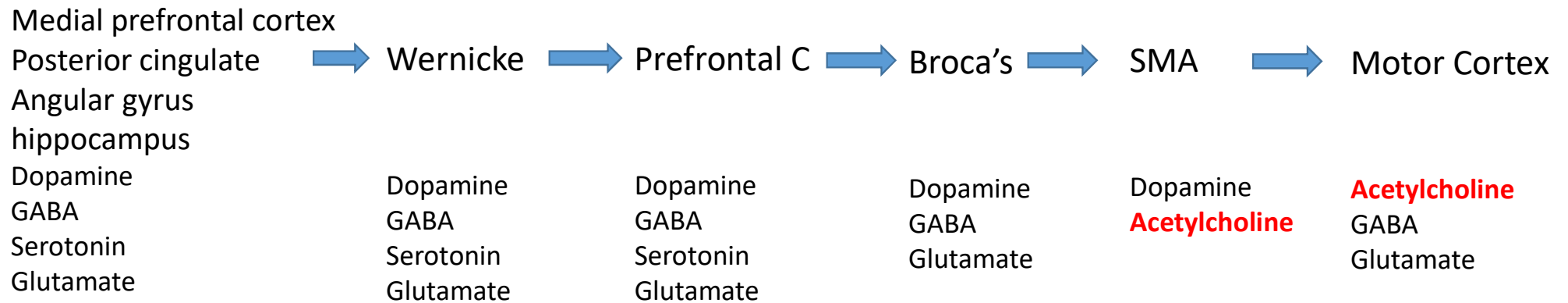
Combination of Neurotransmitters

- **Dopamine:** Dopamine is involved in auditory processing and speech production. It plays a crucial role in regulating the flow of information from the auditory nerve to the brain, and is also implicated in the coordination of speech muscles [1](#).
- **Serotonin:** Serotonin regulates mood and emotional responses to sound. It is involved in modulating the processing of auditory information and can influence an individual's emotional response to music and other sounds [2](#).
- **GABA (Gamma-Aminobutyric Acid):** GABA is an inhibitory neurotransmitter that helps regulate auditory processing. It acts to reduce the excitability of neurons, preventing excessive activity in the auditory pathway [3](#).
- **Glutamate:** Glutamate is an excitatory neurotransmitter involved in learning and memory. It plays a key role in the processing and consolidation of auditory information, and is essential for the formation of new memories related to sound [4](#).

Formation of Neurotransmitters

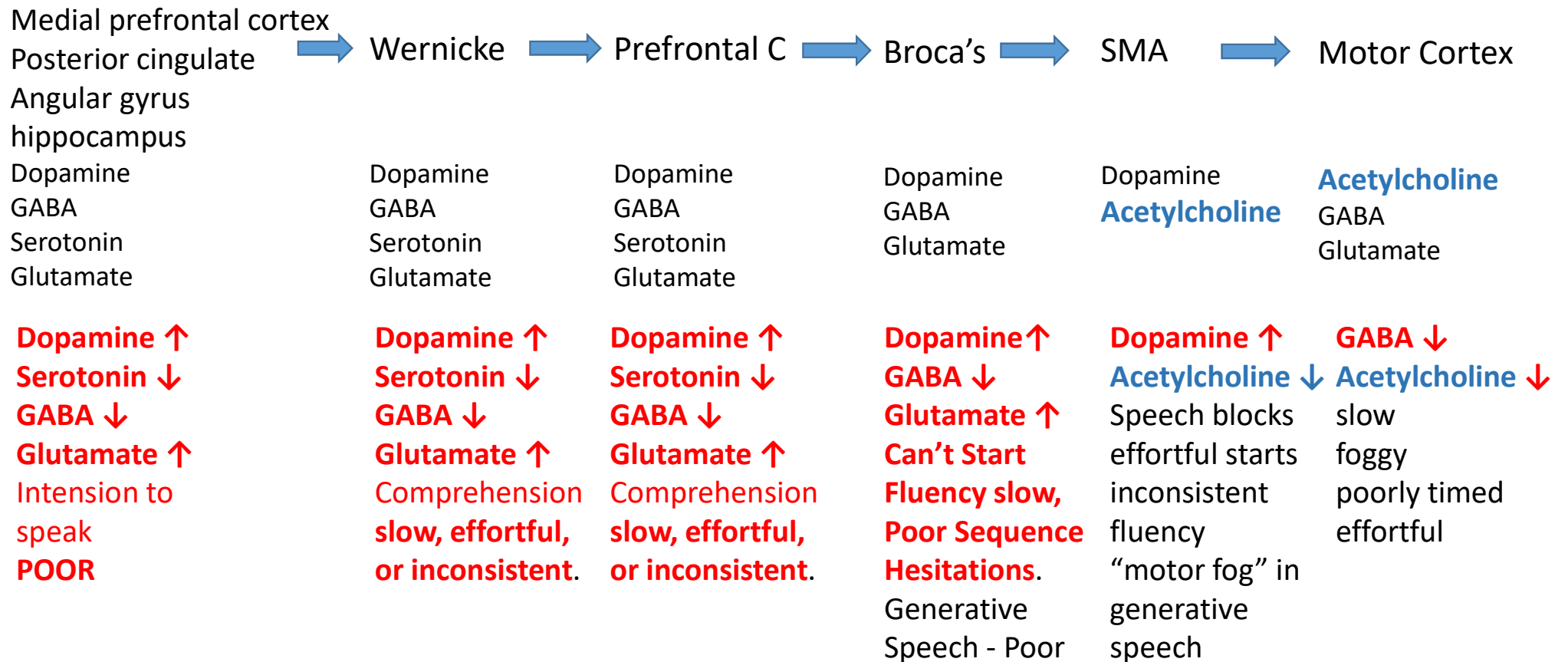
- Dopamine
- Serotonin
- GABA
- Glutamate

Generating speech from Thought

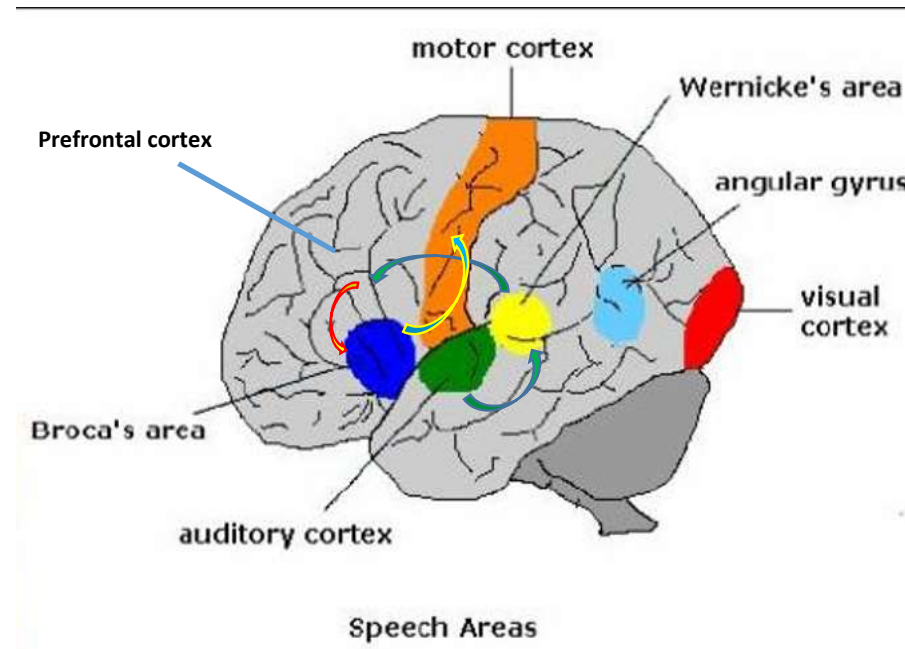
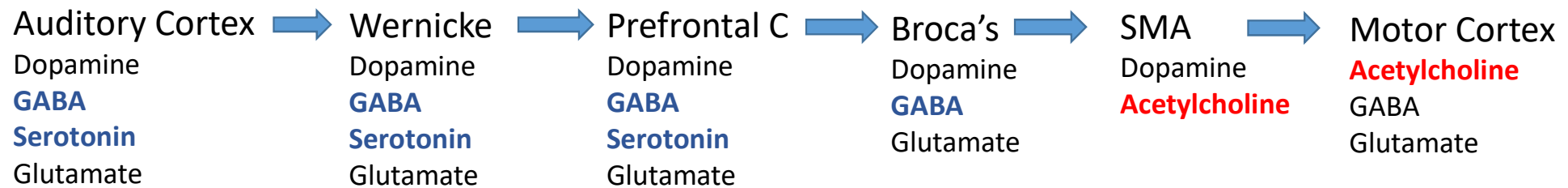


Generating speech from Thought

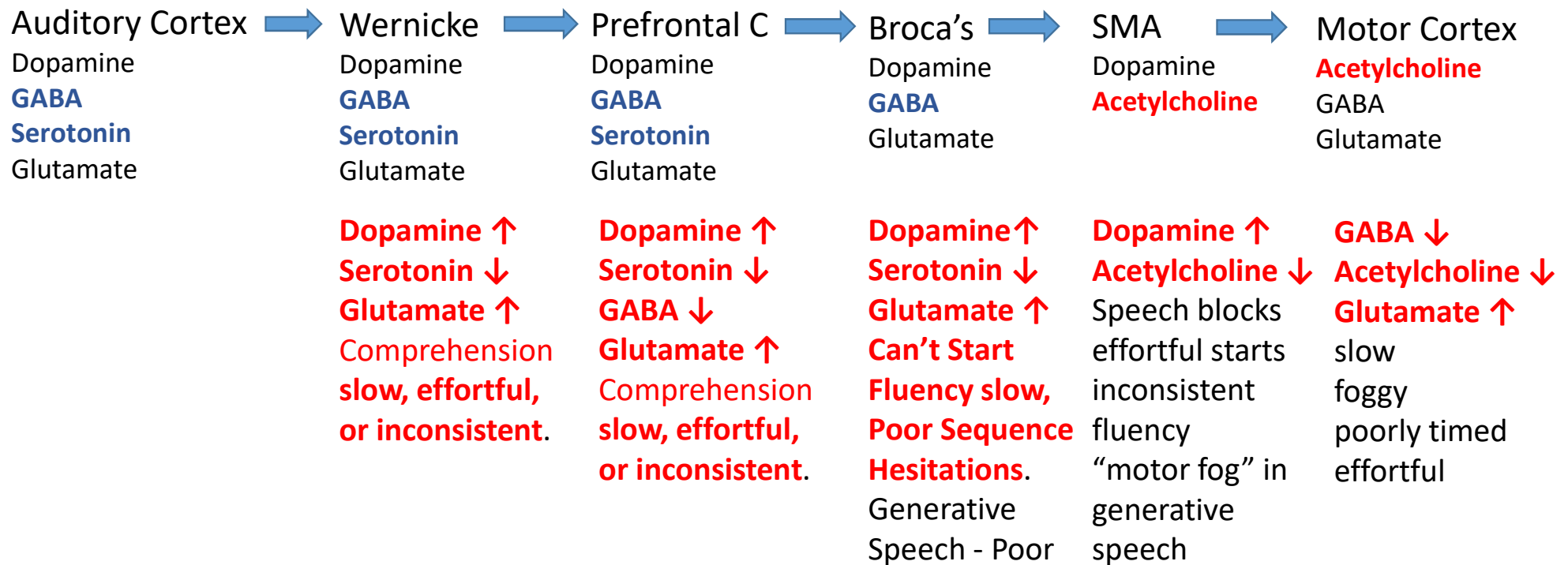
I/Se Deficiency



Response to question asked

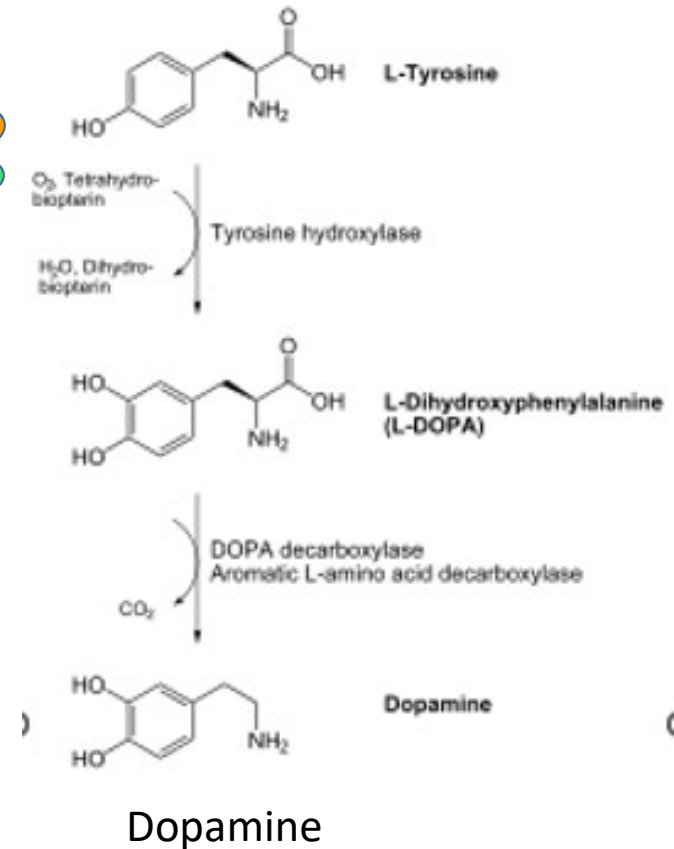
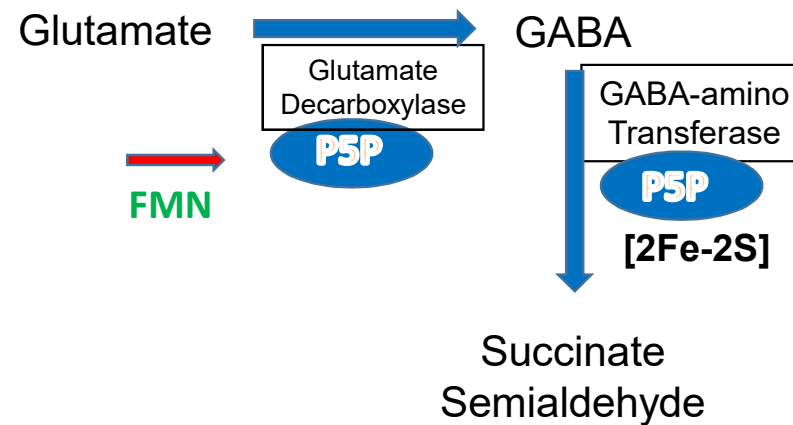
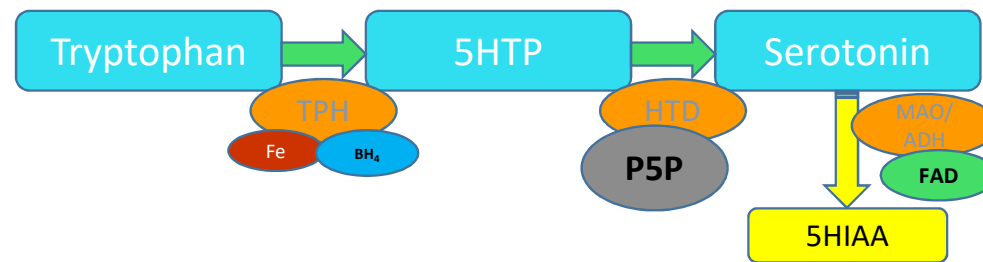


Response to question asked I/Se deficiency



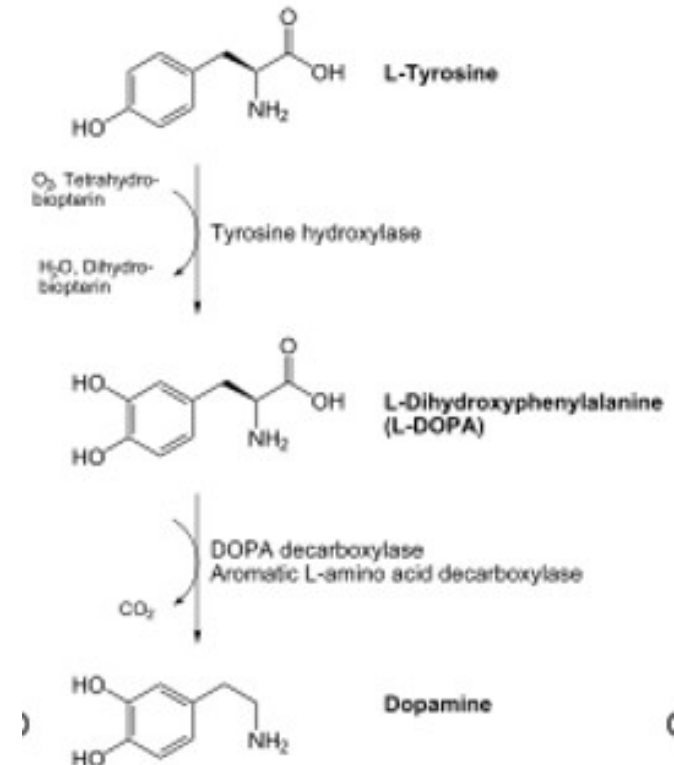
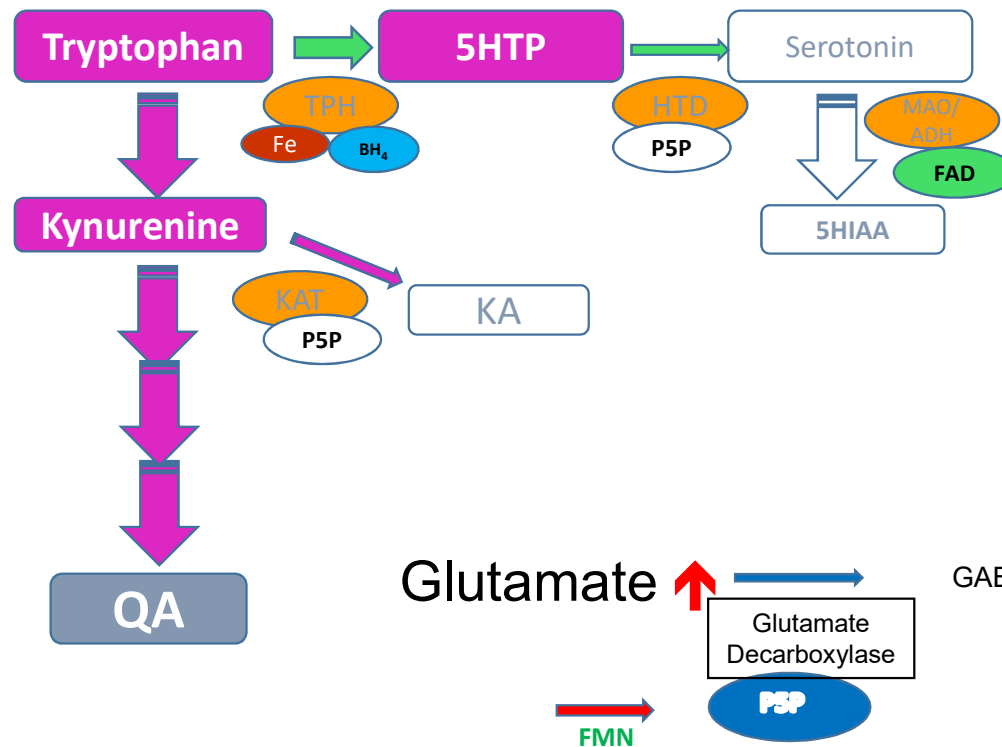
Neurotransmitters and Speech

- Dopamine
- Serotonin
- GABA
- Glutamate



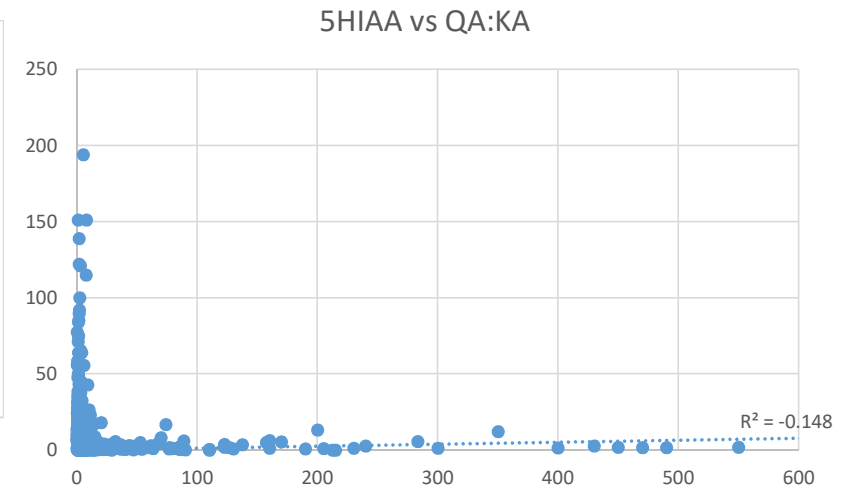
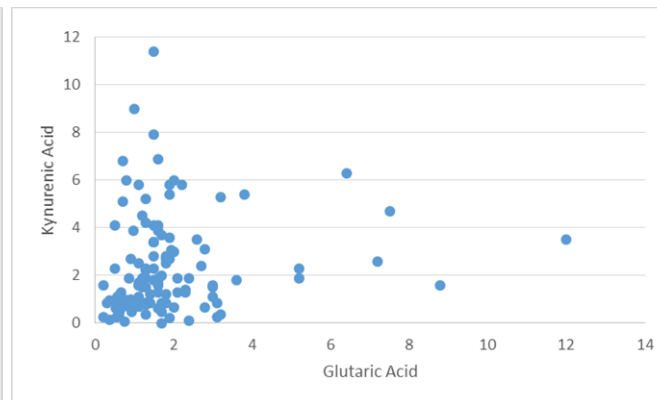
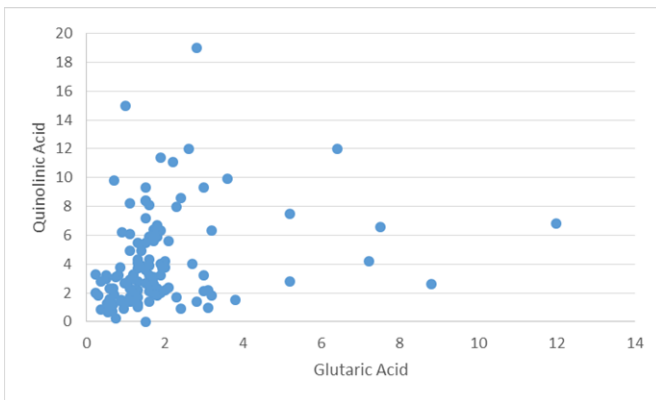
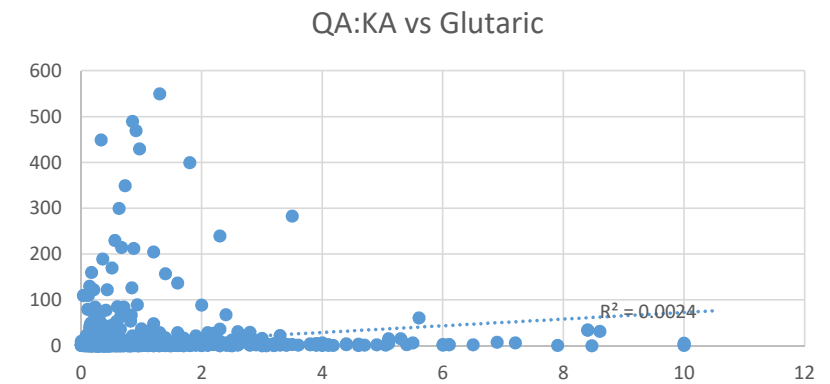
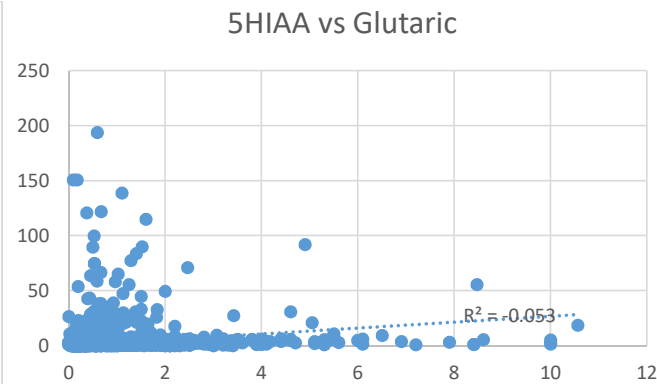
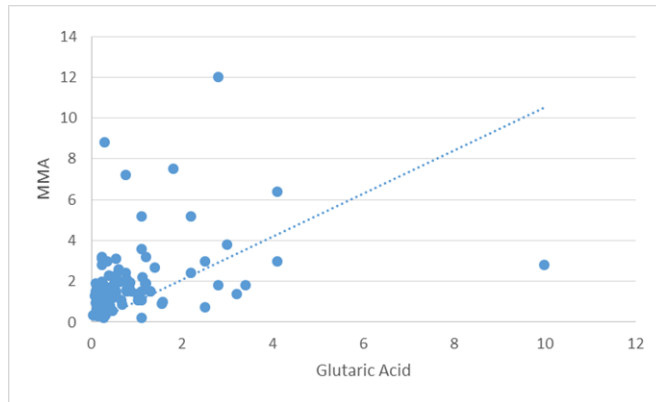
Neurotransmitters and Speech Iodine/Selenium Deficiency

- Dopamine ↑
- Serotonin ↓
- GABA ↓
- Glutamate ↑



Dopamine ↑

Serotonin Metabolism in ASD B2 Deficiency



Altered Speech in Autism

- Lack of Iodine/ Selenium => Functional B2/B6 deficiency
- Underproduction of GABA and Serotonin
- Over-expression of Glutamate (excitatory) and Dopamine
- Reduction in
 - Expressive Language, when required
 - Ability to answer simple questions
- Lack of development of speech.
- Receptive language may be OK
- Requirement for Rote language

Speech

Approximately 25% to 30% of children diagnosed with autism either do not develop functional language or are minimally verbal, meaning they have limited speech capabilities.

Key Statistics

- **Nonverbal Autism:** Research indicates that about **25% to 30%** of autistic individuals are considered nonverbal, meaning they do not develop functional spoken language [goldencaretherapy.com+1](https://goldencaretherapy.com).
- **Functional Speech:** Approximately **30%** of individuals with autism do not develop speech that is sufficient for meeting everyday communication demands [Penn State York](https://pennstate.edu).
- **Minimally Verbal:** Estimates suggest that around **25% to 30%** of children with autism are minimally verbal, using fewer than 30 functional words or relying on alternative communication methods [goldencaretherapy.com+1](https://goldencaretherapy.com).