



Dr Anthony Vernon

Topic 3:

**Neurotransmission defects
and mental health: Focus on
schizophrenia**

Part 1 of 3

Module:

Biological Foundations of Mental Health

Week 3:

Synaptic transmission and neurotransmitter systems

Topic list



This week, we will be looking at the following topics:

- Topic 1: Action potentials and synaptic transmission
- Topic 2: Neurotransmitters, receptors and pathways
- ***Topic 3: Neurotransmission defects and mental health:
Focus on schizophrenia***

Click **Next** to continue

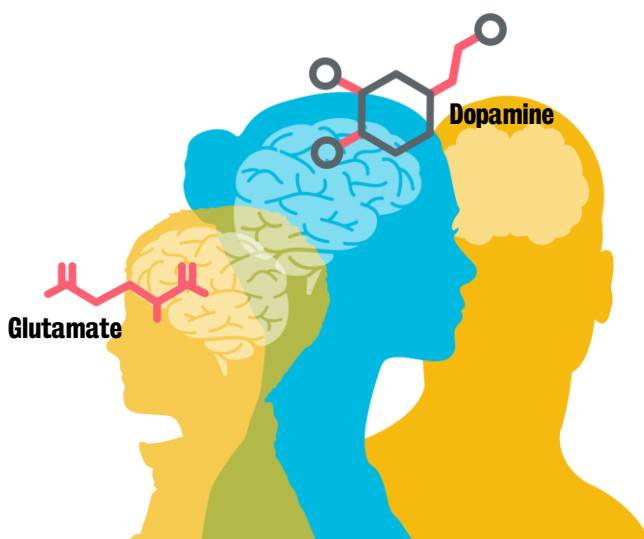
Part 1

Week 3 Synaptic transmission & neurotransmitter systems

Topic 3: Neurotransmission defects and mental health: Focus on schizophrenia

3 of 11

Introduction



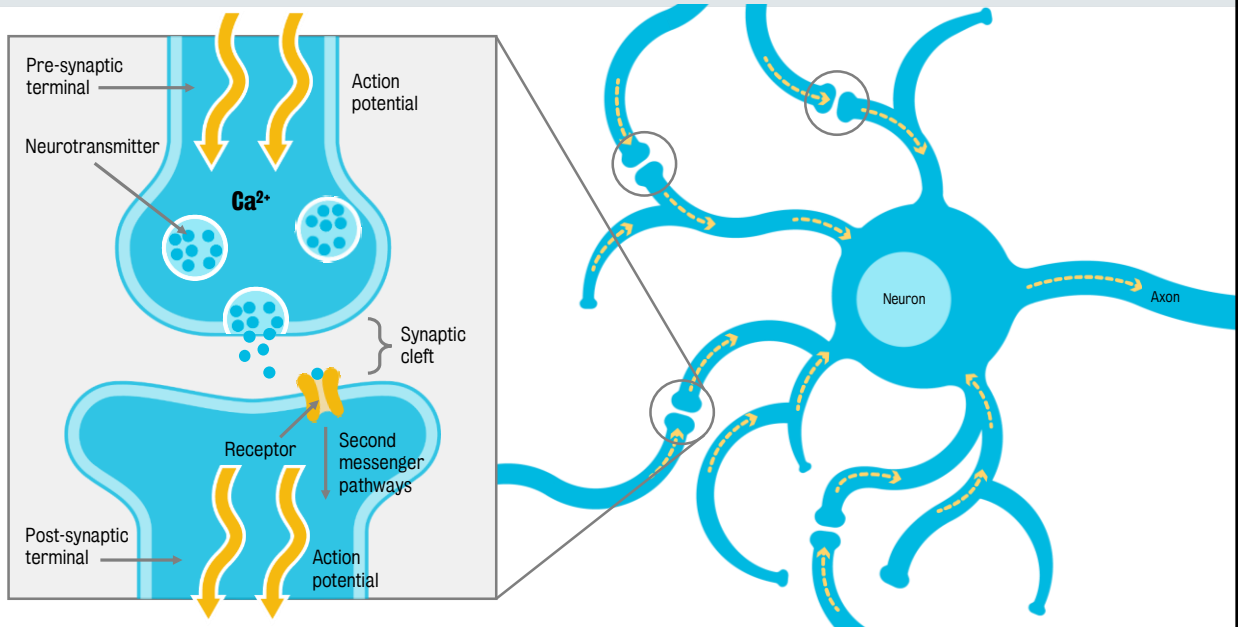
Defects in neurotransmission are associated with several mental health problems.

Week 3 Synaptic transmission & neurotransmitter systems

Topic 3: Neurotransmission defects and mental health: Focus on schizophrenia

4 of 11

The fundamentals of neurotransmission

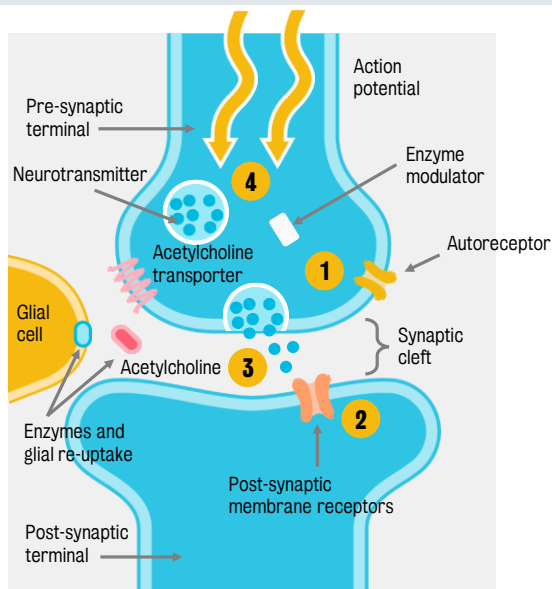


Week 3 Synaptic transmission & neurotransmitter systems

Topic 3: Neurotransmission defects and mental health: Focus on schizophrenia

5 of 11

Neurotransmitter dysregulation



Neurotransmitters are essential for the transfer of electrical information between neurons, and modulate the flow and rate of information transfer within a network.

Neurotransmission is a tightly regulated process.

- 1 **Neurotransmitter release**
- 2 **Neurotransmitter sites of action**
- 3 **Neurotransmitter degradation**
- 4 **Neurotransmitter synthesis and storage**

This regulation ensures correct fidelity of **synaptic signalling**.

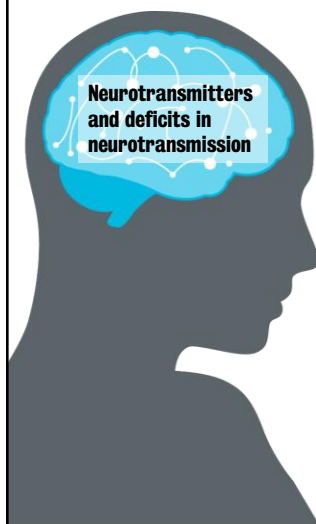
When this equilibrium is altered, there is a **disruption of the normal patterns of synaptic signalling**, which ultimately manifests as a **behavioural consequence**.

Week 3 Synaptic transmission & neurotransmitter systems

Topic 3: Neurotransmission defects and mental health: Focus on schizophrenia

6 of 11

Looking at the association between schizophrenia and neurotransmitters



Schizophrenia

Definition:

Severe psychiatric disorder characterised by major disturbances in thought, emotion, and behaviour.

Diagnosis:

There is no diagnostic pathology for schizophrenia and diagnosis is currently based on clusters of symptoms (described as positive, negative, and cognitive).

Relatability with other psychiatric disorders:

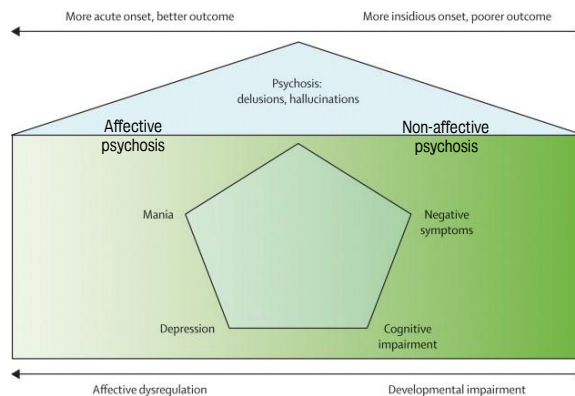
Similarly to other psychiatric disorders, patients display cognitive impairments. In contrast, however, schizophrenia is characterised by psychotic episodes consisting of both positive and negative symptoms.

Prevalence:

Affects approximately 1% of the UK population.

Onset:

Typically in late adolescence or in early adulthood.



van Os & Kapur (2009)

Positive, negative and cognitive symptoms

Positive

Definition:

Additional features that are not ordinarily present.

Symptoms:

Delusions

Represent an idiosyncratic belief or impression which is maintained despite being contradicted by reality or rational argument.

Hallucinations

Generally auditory, where patients may hear voices as though they come from the outside and are often critical of the person. These may also be visual, or related to smell, taste or touch.

Thought disorder

May show up as disordered speech, including rapid changes of subject, the use of invented words, or an inappropriate emotional response to other people in a particular situation.

Negative

Definition:

Refers to a loss or reduction in normal function.

Symptoms:

Alogia

The function being reduced speech

Affective flattening

A lack of emotional facial expression

Avolition

A diminished ability to begin and sustain an activity (related to motivation)

Anhedonia

No longer able to find pleasure in something that was previously enjoyable

Asociality

Social withdrawal

Cognitive

Definition:

Specific impairments in certain cognitive domains that greatly affect the patient's life and work.

Symptoms:

Working memory

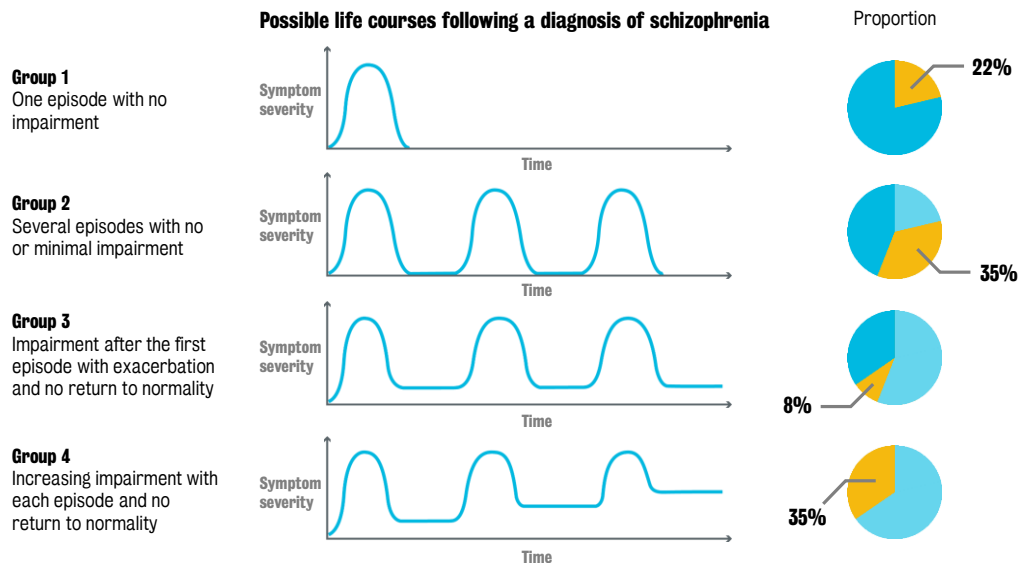
Spatial memory

The ability to pay attention

Executive functions

(planning and decision making)

Schizophrenia life-courses

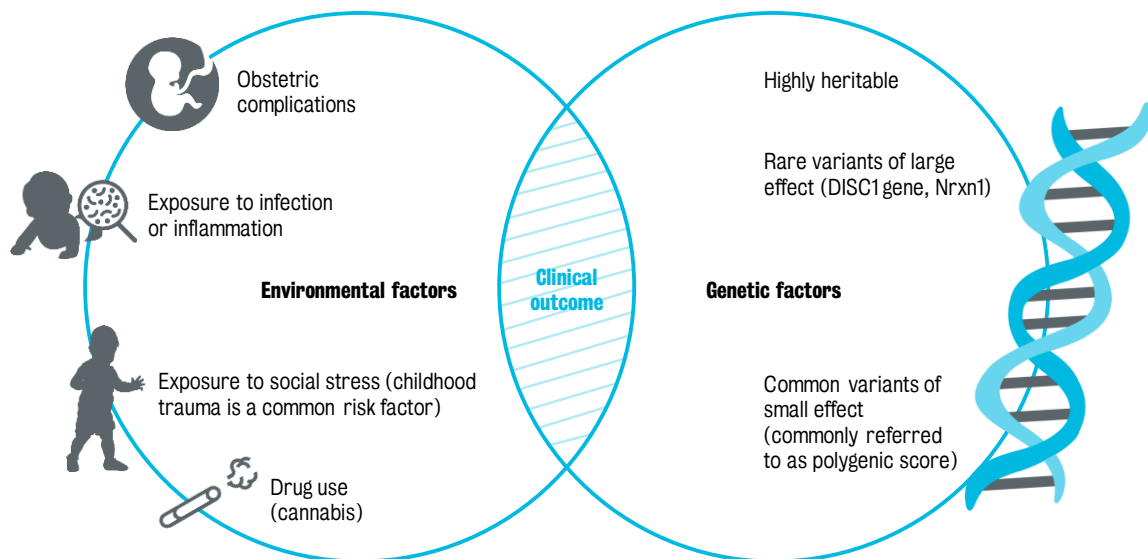


Week 3 Synaptic transmission & neurotransmitter systems

Topic 3: Neurotransmission defects and mental health: Focus on schizophrenia

9 of 11

Epidemiology risk factors



Schmidt & Mirnic (2015)

Week 3 Synaptic transmission & neurotransmitter systems

Topic 3: Neurotransmission defects and mental health: Focus on schizophrenia

10 of 11

End of part 1