Psyhosis: Schizophrenia
Schizophrenia – What is it?

- A psychotic disorder involving disturbance of thought, emotion, and behavior
- Considered by many to be the most devastating mental illness that exists
- Lifetime prevalence of about 1%
- Onset usually in late adolescence
- Substance abuse is co-morbid in about 50% of schizophrenia patients

Artwork by S. Lawton who suffers from schizophrenia
Characteristics

- Broad Impairments
- Thought disorder
- Delusions
- Hallucinations
- Disorganized speech
- Inappropriate emotions
- Catatonia or immobility
- Loss of touch with reality
NOT split personality

- It’s not multiple personality or split personality disorder – that’s a common myth!
- Rather it’s a **shattered** personality
Symptom summary

**Positive Symptoms**
“Positive” refers to overt symptoms that should not be present. These include:
- Hallucinations
- Delusions
- Disorganized thoughts

**Negative Symptoms**
“Negative” does not refer to a person’s attitude, but instead to a lack of characteristics that should be present. These include:
- Reduced speech, even when encouraged to interact (alogia)
- Lack of emotional and facial expression (affective flattening)
- Diminished ability to begin and sustain activities (avolition)
- Decreased ability to find pleasure in everyday (anhedonia)
- Social withdrawal (asociality)

**Cognitive Deficits**
Difficulties with following aspects of cognition can make it hard to live a normal life or earn a living:
- Memory
- Attention
- Planning
- Decision Making
Hallucinations

- Sensory experiences that happen in the absence of environmental stimulation
- Most commonly auditory (hearing voices)
- Are not “in the patient’s head” but are actually perceived through sensory regions of the brain (e.g. auditory cortex) which are active during hallucination.

(a) Activation in response to auditory stimulation during hallucinations compared to (b) following recovery, suggesting competition from endogenous stimulation by hallucinations in (a).

Halligan and David, Nature Rev Neurosci 2001
Delusions

- Beliefs held with strong conviction despite evidence to the contrary.
  - **Grandeur**: patient believes he/she is somehow special or has supernatural powers, famous, or immortal.
  - **Persecution**: patient believe he/she is being targeted, followed, conspired against, spied on, or attacked (paranoid)
Delusions and Hallucinations
Thought Disorder

- Trouble organizing thoughts and logically connecting them.
- Can manifest as garbled paraphasic speech with made up words (neologisms).
- Tangential thought – concepts are only loosely associated and not clear.
- Lack of observance for the main subject of discourse. Deviates from discourse to irrelevant and tangential ideas.
- Logic is circumstantial.
Thought Disorder
Observed psychotic symptoms

- Voices speak one’s thoughts out loud
- Two or more hallucinated voices discuss one in third person
- Voices describe one’s actions as they happen
- Bodily sensations are imposed by an external force
- Thoughts stop and one feels they are extracted by an external force
- Thoughts, not really one’s own, are inserted
- Thoughts are broadcast into the outside world and heard by all.
Negative symptoms

- **Negative**: Behavioral deficits
  - **Avolition**: lack of energy and inability to persist in routine activities
  - **Alogia**: refers to a reduction in the amount or content of speech
  - **Anhedonia**: is an inability to experience pleasure
  - **Asociality**: refers to a severe impairment in forming or maintaining social relationships.
Possible motor symptoms

- **Catatonia**: prolonged motor immobility states that alternate with periods of excitability.
External signs of the disease

- Train of thought is incomprehensible and confused
- Incapacity for emotional empathy
- Hallucinations that last more than a few days and not caused by medication use
- Delusions of grandeur or persecution
- Sudden and total neglect of everyday obligation
- Sudden hostility towards friends or strangers
- Report from family and friends that the person is no longer the person they know.
Cognitive Deficits in SZ
Neural Deficits in SZ

Many brain regions and systems operate abnormally in schizophrenia, including those highlighted below. Imbalances in the neurotransmitter dopamine were once thought to be the prime cause of schizophrenia. But new findings suggest that impoverished signaling by the more pervasive neurotransmitter glutamate—or, more specifically, by one of glutamate’s key targets on neurons (the NMDA receptor)—better explains the wide range of symptoms in this disorder.

**Basal Ganglia**
Involved in movement and emotions and in integrating sensory information. Abnormal functioning in schizophrenia is thought to contribute to paranoia and hallucinations. Excessive blockade of dopamine receptors in the basal ganglia by traditional antipsychotic medicines leads to motor side effects.

**Auditory System**
Enables humans to hear and understand speech. In schizophrenia, overactivity of the speech area (called Wernicke’s area) can create auditory hallucinations—the illusion that internally generated thoughts are real voices coming from the outside.

**Occipital Lobe**
Processes information about the visual world. People with schizophrenia rarely have full-blown visual hallucinations, but disturbances in this area contribute to such difficulties as interpreting complex images, recognizing motion, and reading emotions on others’ faces.

**Frontal Lobe**
Critical to problem solving, insight, and other high-level reasoning. Perturbations in schizophrenia lead to difficulty in planning actions and organizing thoughts.

**Limbic System**
Involved in emotion. Disturbances are thought to contribute to the agitation frequently seen in schizophrenia.

**Hippocampus**
Mediates learning and memory formation, intertwined functions that are impaired in schizophrenia.

Alfred T. Kamajian
Etiology – causes of SZ

- Genetics?
  - Runs in families
  - Genetic risk but no deterministic genes
  - Genetic concordance rate about 40-60% based on identical (i.e. monozygotic) twin studies
- Early childhood or in utero brain damage (e.g. due to hypoxia) or viral infection
- Acute stressful episode during adolescence may interact with a genetic or developmental vulnerability to precipitate the disease
Pruning abnormality in SZ?

Natural history of schizophrenia

Kesby et al. Frontiers of Cellular Neuroscience 2013
Treatments for SZ - Antipsychotics

- **Typical antipsychotics** (available since 1950’s)
  - Chlorpromazine (Thorazine)
  - Haloperidol (Haldol)
  - Perphenazine (Etrafon, Trilafon)
  - Fluphenazine (Prolixin)

- **Atypical antipsychotics** (new generation 1990’s)
  - Clozapine (Clozaril) → can cause agranulocytosis
  - Risperidone (Risperdal)
  - Olanzapine (Zyprexa)
  - Quetiapine (Seroquel)
  - Ziprasidone (Geodon)
  - Aripiprazole (Abilify)
  - Paliperidone (Invega)
Cure?

- No cure or prevention yet
- Treatments are reasonably effective at least in terms of alleviating positive symptoms
- A lot of clinical research in this area

NAPLS is a consortium of clinical research programs dedicated to the early detection and prevention of psychotic disorders and other forms of serious mental illness.
Some Hollywood Portrayals