

NEUROPSYCHOPHARMACOLOGY

1961-2011: 50 Years of Progress

1960s

Protein phosphorylation as a biological regulatory mechanism, late 1950s-early 1960s

Peptide hormone production in the brain, mid 1950s-early 1960s

1 Hamilton Rating Scale for Depression, 1960

Involvement of serotonin and norepinephrine in the actions of antidepressants, 1960-1966

2 Mechanisms for storage, release and inactivation of biogenic amine transmitters, early 1960's

Benzodiazepines for the treatment of anxiety, 1960-63

L-DOPA for the treatment of Parkinson's disease, 1962-1968

Stimulants for the treatment of ADHD, 1963

Histofluorescence for visualization and mapping of brain monoamines, 1963

Dopamine receptor antagonism in the actions of antipsychotic drugs, 1963

SPECT Instrumentation, 1963-1964

Methadone treatment for opiate addictions, 1964

Clinical Trial Ethics - Declaration of Helsinki, 1964

Drug discrimination to assess subjective effects of drugs in animals, 1964

ICD-8 with expanded chapter on mental disorders, 1965

Federal Laboratory Welfare Act that regulates the treatment of animals in research, 1966

LTP, 1966

Imipramine for treatment of panic disorders, 1967

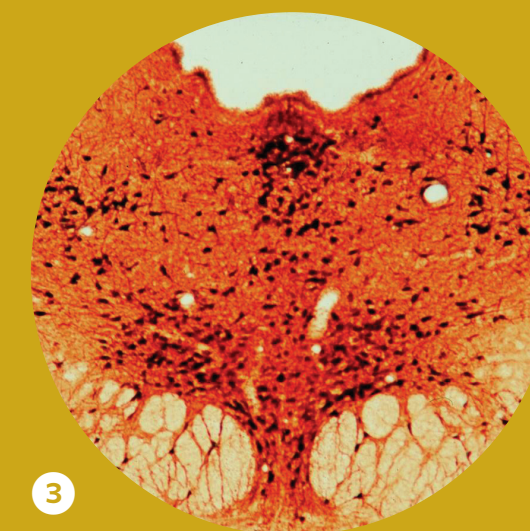
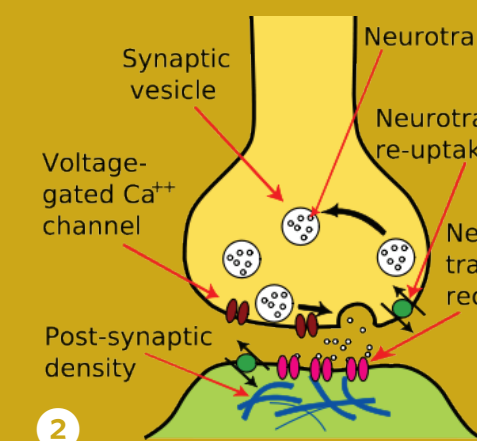
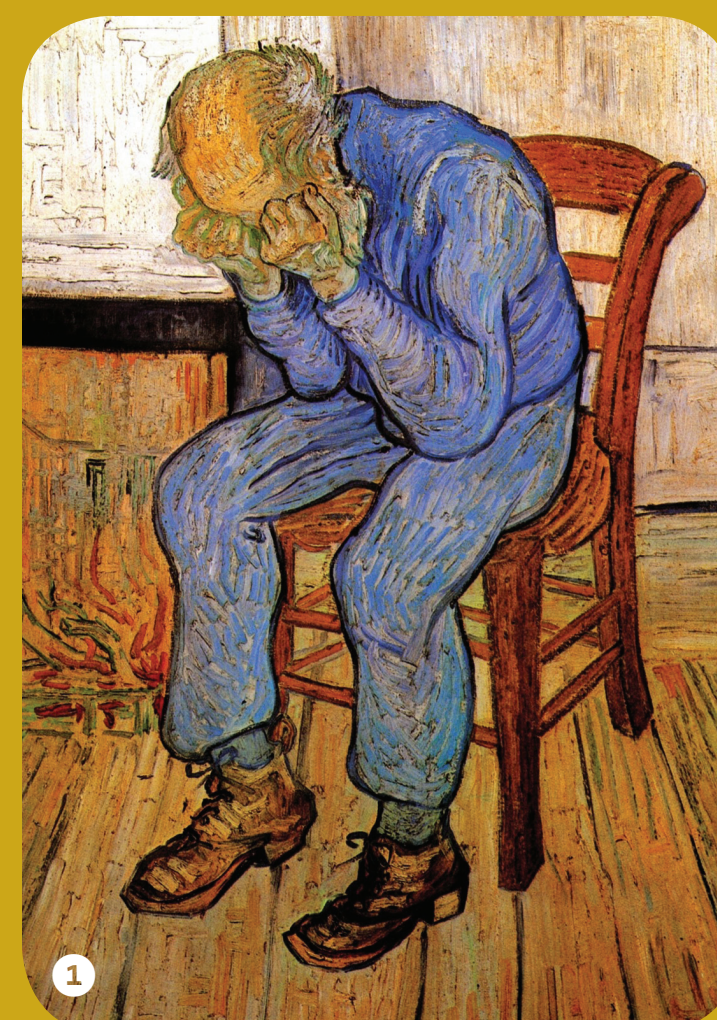
DSM-II, 1968

Descriptor of stages of EEG sleep and their measurement, 1968

3 Immunohistochemistry to label specific neuronal subpopulations in brain, 1969.

Selective neurotoxins to lesion catecholamine or serotonin neurons in brain, 1968-1973

Family, adoption and twin studies showing impact of heredity on psychiatric illnesses including alcoholism and drug abuse, 1962



Immunohistochemistry of 5-HT in the DRN

1970s

Presynaptic autoreceptors, early 1970s

Role of synaptic and molecular plasticity in learning and memory, in psychotropic drug action and in disease pathophysiology, 1970

Opioid receptors as targets of opiate drugs, 1971

Research Diagnostic Criteria, 1972

PET Instrumentation, 1972-1975

MRI Instrumentation, 1973-1979

4 2-deoxyglucose autoradiography to image functional changes in brain activity, 1974

G-proteins and their role in signal transduction, mid 1970s-early 1980s

IRBs, 1974

Sanger method for sequencing DNA, 1975

Single ion channel function (patch clamp), mid-late 1970s

5 Endorphins and enkephalins, 1975-1976

6 GABA-A receptors as the target for benzodiazepines, 1975-1978

Radioligand binding methodology, early 1970s

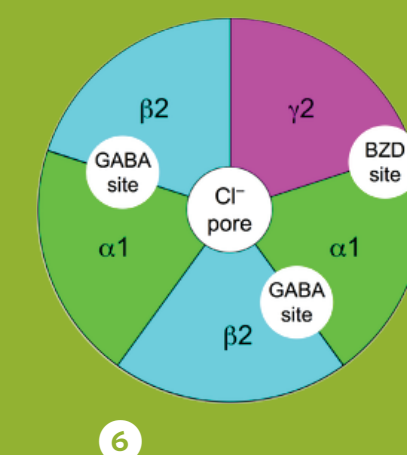
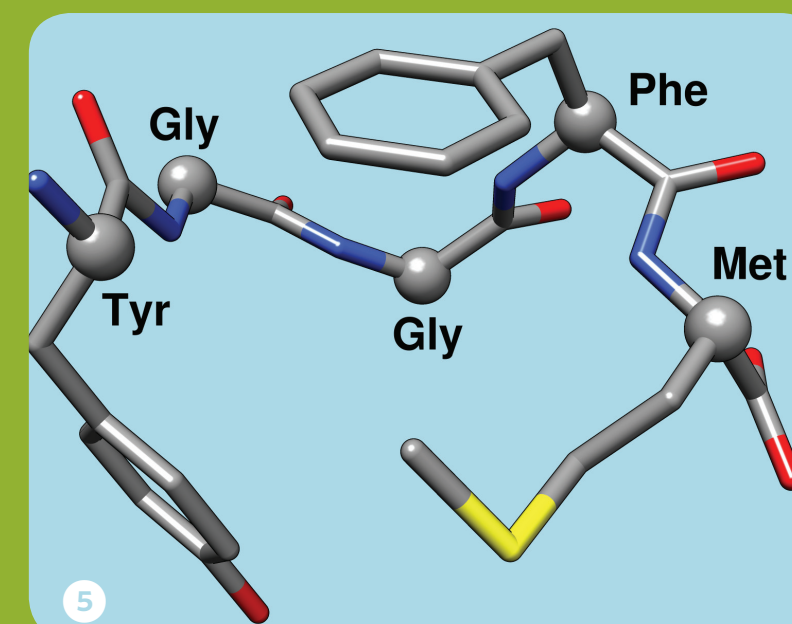
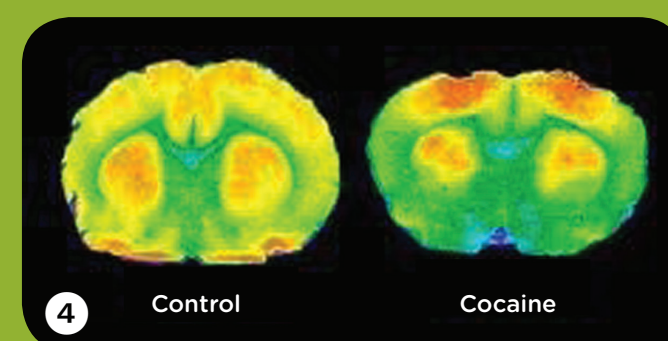
Acetylcholinesterase inhibitors for the treatment of Alzheimer's Disease, 1978

Schedule for Affective Disorders and Schizophrenia (SADS), 1978

PET Human Glucose Metabolism, 1978-1979

National Alliance for the Mentally Ill (NAMI), 1979

Synaptic vesicle-associated proteins and their involvement in transmitter release, late 1970s-early 1980s



1980s

"Linkage" methodology for genetic diseases, 1980

Buprenorphine for opiate addiction, 1980

Structural MRI for brain, 1980

PTSD as a diagnostic entity, 1980

DSM-III, 1980

PET Human Cerebral Blood Flow, 1980 -1983

NARSAD, 1981

Microdialysis methodology, 1982

Discovery that schizophrenia involves alterations in cytoarchitecture, 1982

Cloning and characterization of the nicotinic acetylcholine receptor, 1983

5-HT2A receptors as a target for behavioral effects of major hallucinogens, 1983

7 PET for Human Dopamine (D2/D3) receptors, 1983

PCR, 1983

8 In situ hybridization histochemistry to visualize gene expression in brain, 1983

Nicotine patch for treatment of nicotine addiction, 1985

Naltrexone for treatment for opioid dependence, 1985

Cloning and characterization of neurotransmitter G-protein coupled receptors, 1986

Cloning and characterization of gamma-aminobutyric acid (GABA) and glycine ionotropic receptors, 1987

SSRI (fluoxetine) for the treatment of MDD, 1987

Dopamine transporters as targets for behavioral effects of cocaine, 1987

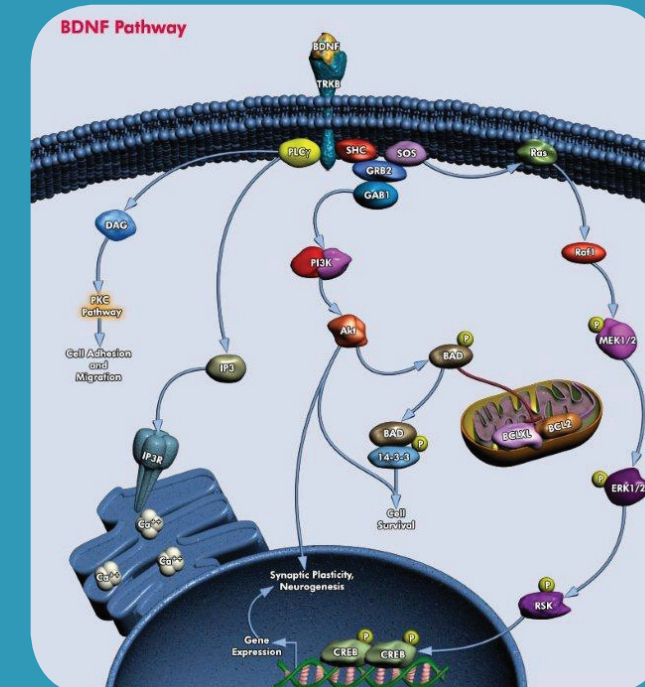
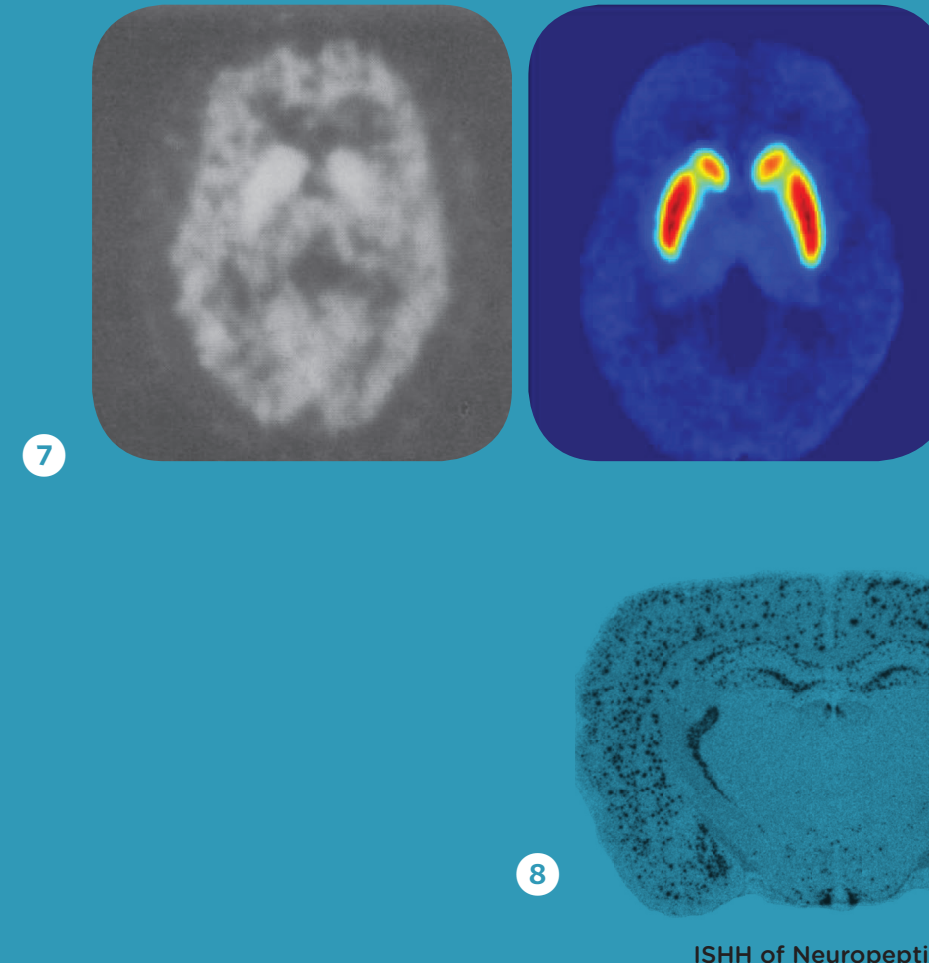
DSM-III-R, 1987

Knockout mice, 1989

5-HT2A receptors as a target for behavioral effects of atypical antipsychotic drugs, 1989

9 BDNF and the neurotrophin family, 1988-1990

RNA interference, gene silencing by double-stranded RNA, late 1980s-late 1990s



1990s

10 Antidepressants for preventing recurrences of MDD, 1990

11 Cannabinoid receptors as targets for marijuana, 1990 and endocannabinoids, 1992

High throughput sequencing of DNA, 1990

Cloning and characterization of plasma membrane and vesicular transporters, 1990-1992

Viral vector-mediated gene transfer, 1991

Naltrexone for alcohol addiction, 1992

Functional MRI for brain, 1992

Endogenous cannabinoids, 1992

Neuropharmacology of cognitive circuitry, 1992

Development of first line atypical antipsychotics based on 5-HT2A/D2 receptor antagonism, 1992-1999

Huntington's Disease gene and the role of trinucleotide repeats in disease pathology, 1993

WHO ICD-10 Diagnostic Classification of Mental and Behavioural Disorders: Diagnostic Criteria for Research, 1993

Anticonvulsants for manic mood stabilization, 1994

Brain reward circuits reflexively activated in addicted individuals by drug cues, 1994

DSM-IV, 1994

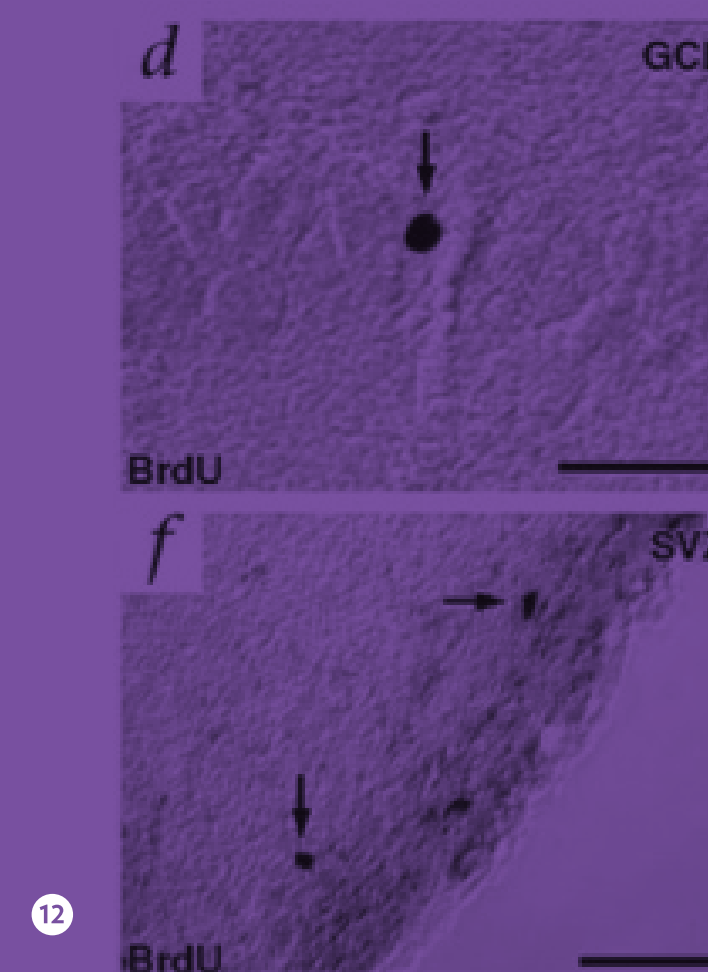
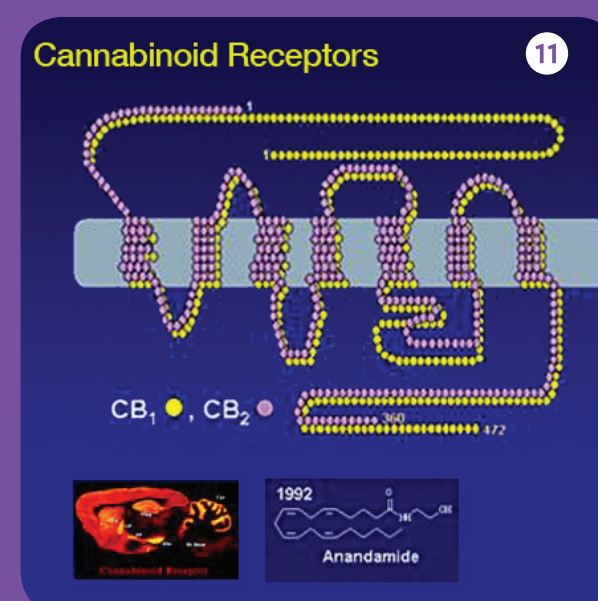
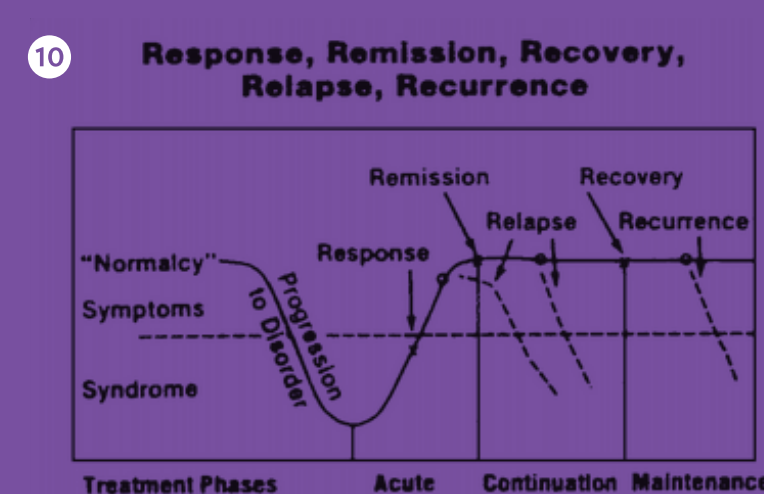
First neurocircuitry model of schizophrenia based on post-mortem studies, 1995

Clozapine as a uniquely efficacious antipsychotic drug for treatment resistant schizophrenia, 1998

12 Re-discovery of neurogenesis occurring in adult mammalian (including human) brain, 1998

Imaging studies showing impact of functional alleles on behaviors, 1998

Large-scale analysis of large protein complexes (proteomics), late 1990s



2000s

Crystal structure of rhodopsin, 2000

13 Draft sequence of the human genome, 2000

NMDA receptor antagonists as rapidly acting antidepressants, 2000

3D structure of an acetylcholine binding protein revealing the ligand binding domain of the nAChR, 2001

Extended release stimulant medications for ADHD, 2000- 2002

Roles for glia in synaptic structure and function, 2001

Clozapine as a uniquely efficacious antipsychotic drug for suicidal patients, 2002

Optogenetic tools to study brain circuitry in behaving animals, early-mid 2000s

Deep brain stimulation for Parkinson's Disease (2002) and OCD (2009)

Varenicline for nicotine addiction, 2006

Crystal structure of the Leucine transporter, 2007

14 Crystal structure of the beta-2 adrenergic receptor, 2007

