Introduction to Psychiatry

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What's going through your mind? How do billions of cells orchestrate life, generate the experience of the soul, and create who we are as a person? What then are mental disorders, and how do we treat them? These are questions psychiatrists ponder. Modern science has led to marvelous breakthroughs in medicine for diseases that can be physically described and modeled, but diseases of the mind remain perplexing. The mind is the final frontier, and much remains to be understood and discovered. For those that are afflicted by mental illness, discoveries cannot come fast enough, and as psychiatrists, it is our privilege to work at the intersection of medicine, neuroscience, culture, and technology to help alleviate patient suffering and incorporate new knowledge as it becomes available. We set out to treat mental illness and understand the inner workings of the mind: things that are in some ways still mysterious but are clearly highly complex. Those who enter psychiatry understand the lifelong learning involved and feel comfortable operating within a gray space. Patients must be considered from multiple viewpoints to construct an accurate formulation and help treat their mental illness. If the state of the specialty is still appealing after hearing all the above, then know that Psychiatry is one of the up-and-coming fields of medicine (Fig. 1.1).

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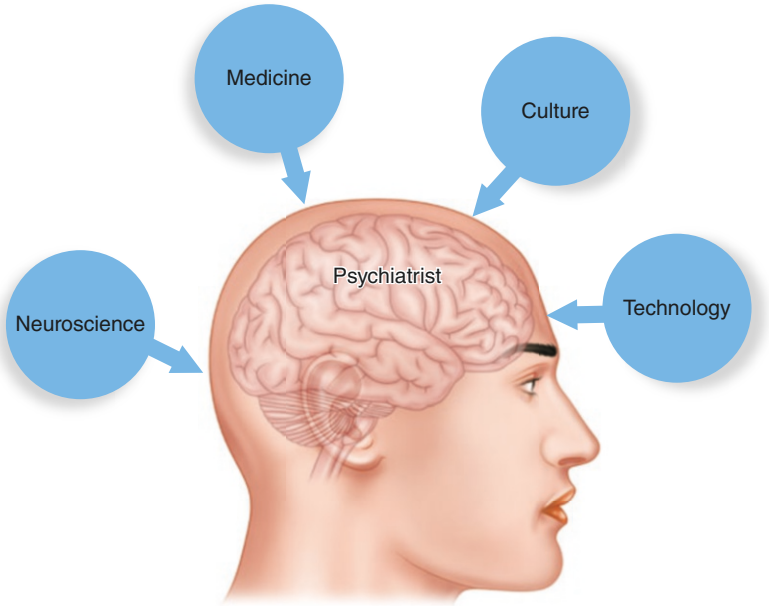


Fig. 1.1 Aspects of psychiatry

Brief History

The history of psychiatry is filled with fascinating narratives, breakthroughs, and cautionary tales. It is easy to look upon earlier attempts to ease psychological suffering and see them as outlandish or even horrifying. But, as you look through the following timeline, consider that we are still operating with very little understanding of how the mind works and that even today, it is possible we are making our own mistakes. If history has anything to offer up, it is that the pathophysiology of psychosis, depression, or other mental pathologies are extraordinarily complex, and as we work to uncover their mysteries, we must remain humble and thoroughly consider hypotheses and their evidence to prevent harming future patients (Fig. 1.2) [1].

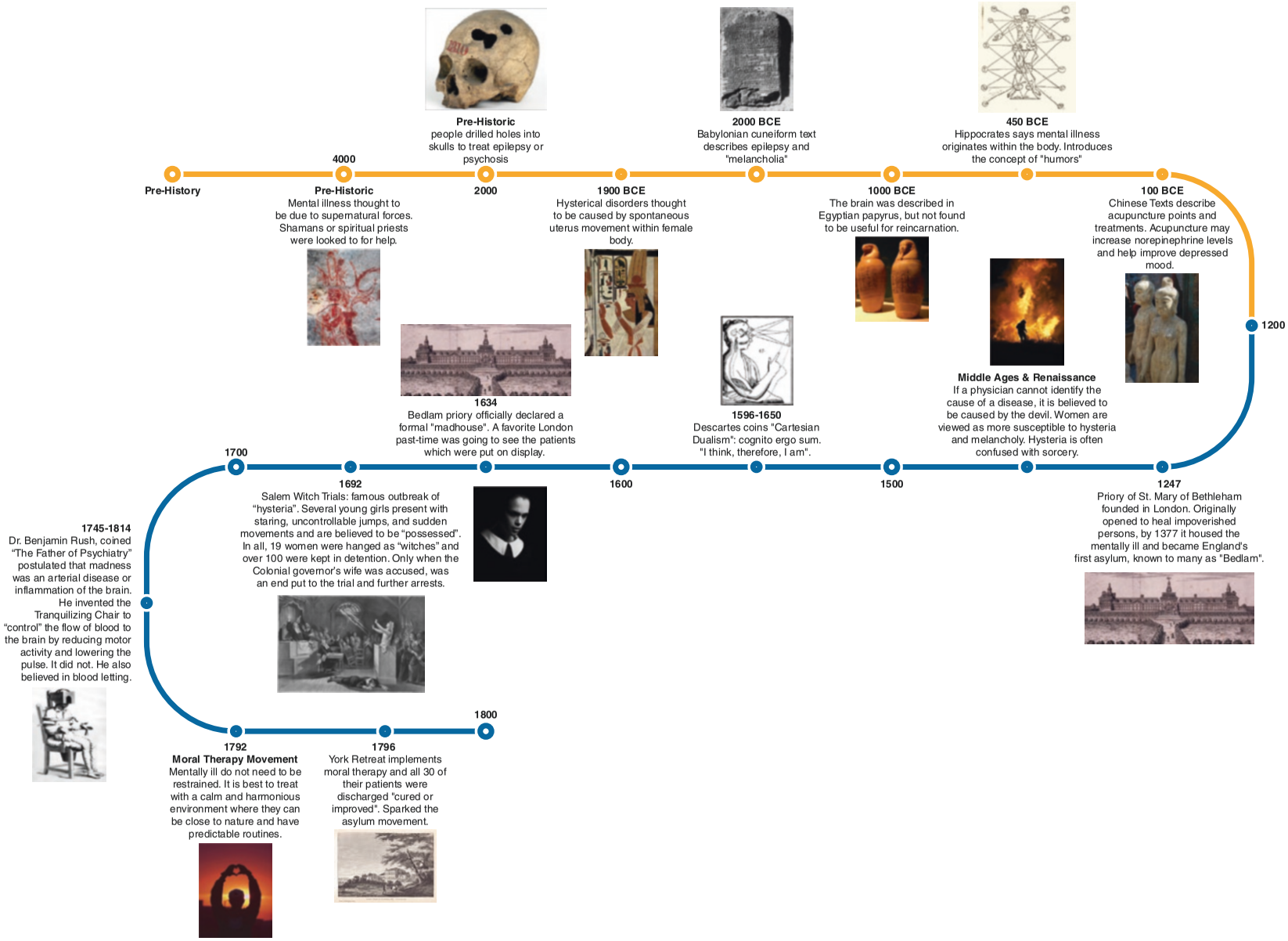


Fig. 1.2 History of psychiatry timeline. *Top Images from left to right*: Trepanned cranium; Cuneiform text; Humors; Bedlam; Moral Therapy; York Retreat; Alzheimer Neurons; Freud Sofa; Kraepelin; Camphor Seizure; ECT Machine; Thorazine; Lithium; Deinstitutionalization. *Bottom Images from left to right*: Shaman; Egyptian; Canopic jars; Acupuncture; middle ages fire; Descartes; Salem witch trials; Tranquility Chair; Thirteen Founders; Bleuler; Brain atrophy; Tooth; AA recovery symbol; Lobotomy MRI; Community; Anti-Psychiatrists; DSM; fMRI [2–9]

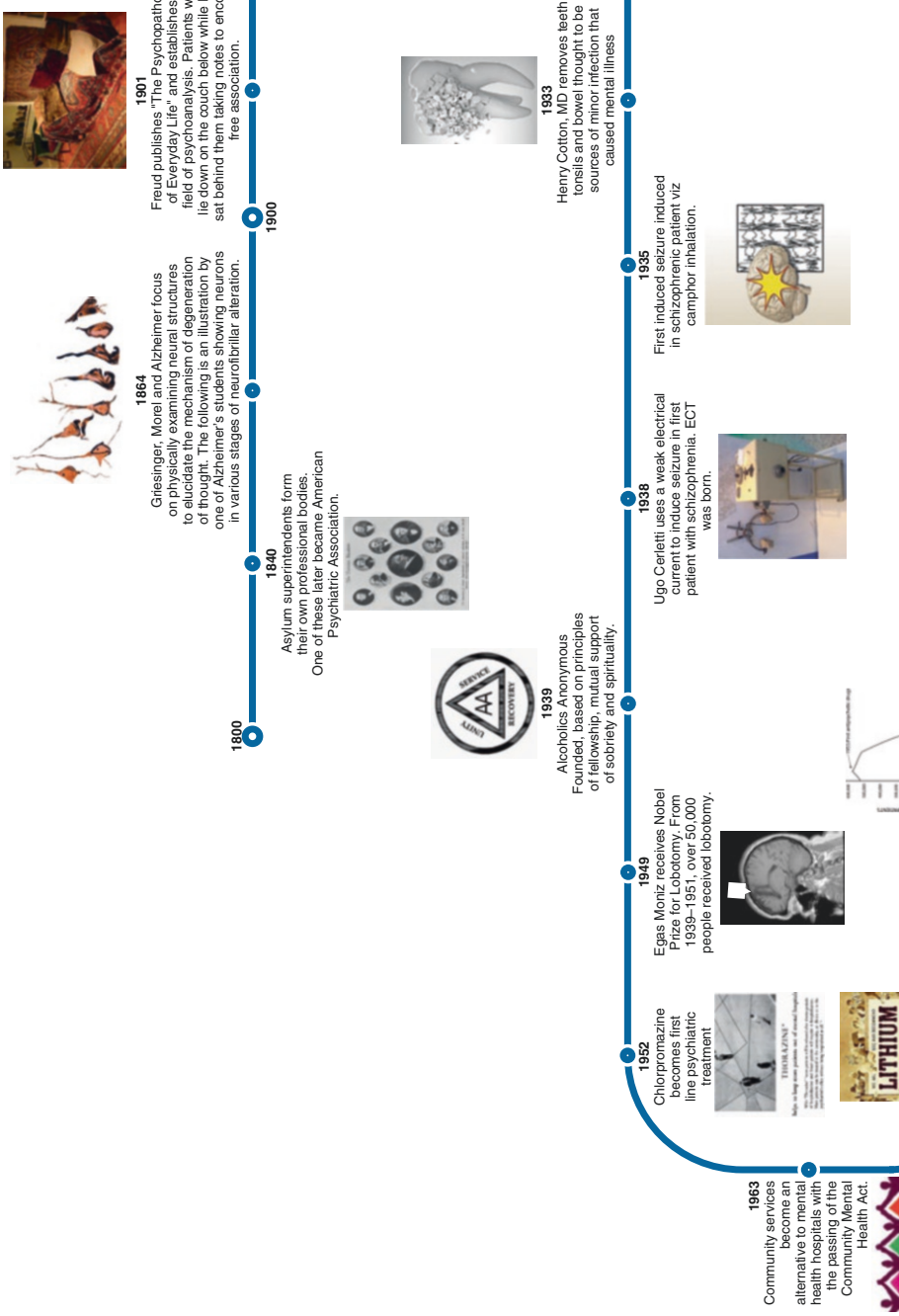


Fig 1.2 (continued)

Medicine

What is the difference between a psychologist, psychiatrist, and neurologist (Fig. 1.3)?

A psychologist is someone with an academic degree, usually a masters or PhD, who specializes in the study of thought and behavior. They conduct experiments to test theories of human behavior. The graduate degree can be more research-focused (PhD) or clinically focused (PsyD). Clinical psychologists can do additional training in a clinical setting to provide talk therapy to patients, such as cognitive behavioral therapy, or perform neuropsychological assessments better to describe a person's deficits or personality pathology. Clinical psychologists do at least 1 year of clinical training as an intern prior to graduation [10].

Psychiatry is a branch of medicine. It is not based on theory but on practice. When someone has symptoms of mental illness, treatments that have been shown to decrease those symptoms are used, even if the mechanism behind that treatment is not fully known. Mental health and the treatments for mental illness determine the scope of psychiatry. Psychiatrists are medical doctors and as such have experience in prescribing medication. Psychiatrists are also educated in and perform a variety of psychotherapy modalities.

Neurology is another branch of medicine. Neurologists focus on treating illnesses that originate from lesions in the brain or nervous system. While there is a lot of overlap between neurology and psychiatry in that many neurological illnesses are complicated by abnormalities in cognition or behavior, psychiatry remains the field of medicine that focuses on illnesses that affect the mind. It is crucial to have a specialty that is an expert in illnesses whose manifestation is in subjective experience and changes in behavior. An often-used analogy is that the brain is the hardware, and the mind is the software. The difference between neurology and psychiatry falls along these lines.

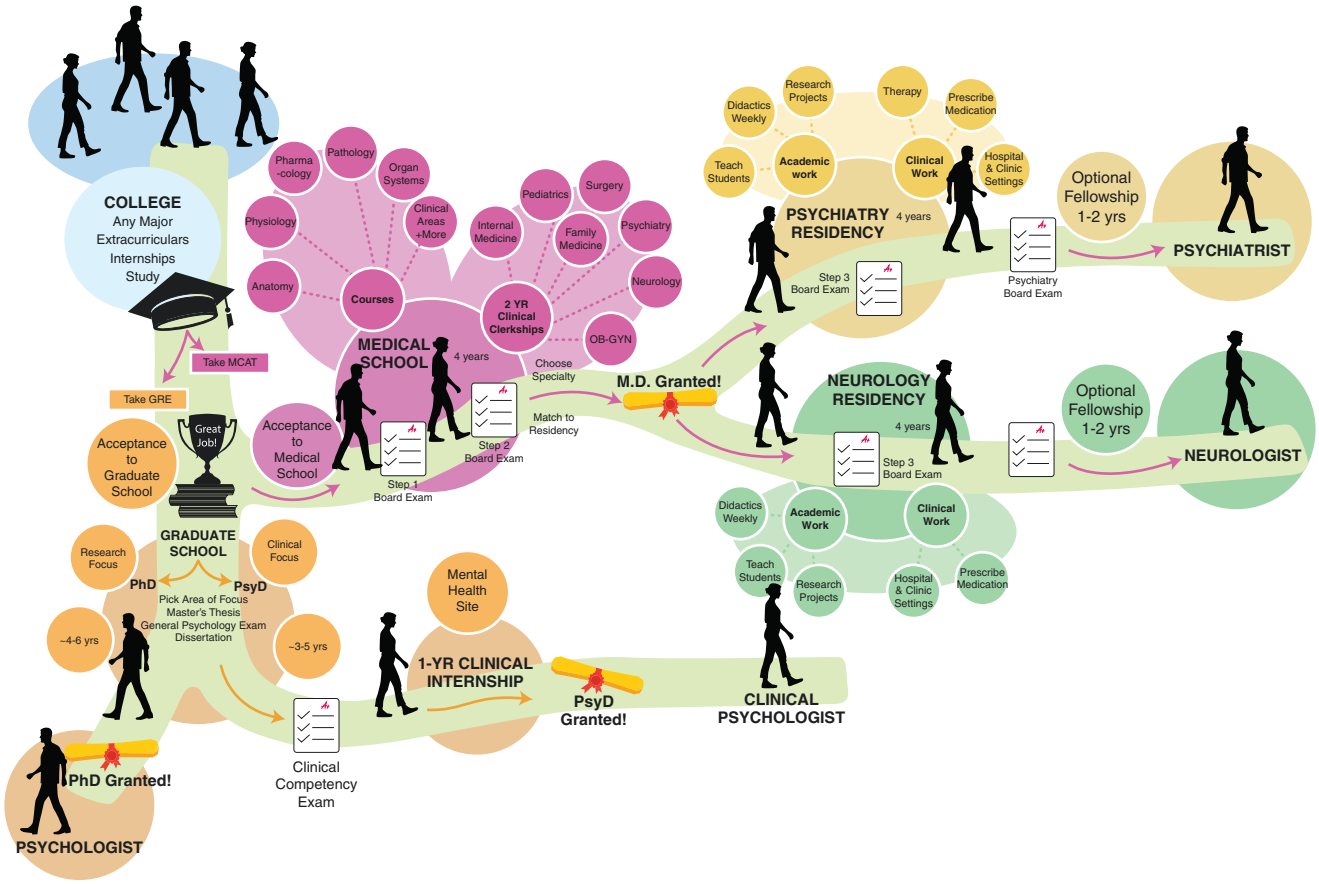


Fig. 1.3 Career paths for psychiatry, psychology, and neurology

Psychopharmacology

Psychopharmacology is a valuable part of psychiatry. For patients suffering from mental illness, medications can make all the difference. Psychiatry relies most heavily on three major classes of medications: antidepressants, antipsychotics, and mood stabilizers. It is important to understand the mechanism of action of these drugs, what they are useful in treating and how to manage their side effects. It is so rewarding to see a patient who is afflicted by symptoms take medication, experience relief, and return to baseline functioning.

The administration of psychiatric medications has challenges though. While prejudice against mental illness has been declining, stigma remains a major barrier for patients and is most obvious during discussions about medication. Unlike drugs for diabetes or bacterial infection, patients are much more hesitant to start an antidepressant or mood stabilizer. It is important to explore all the concerns a patient has and continue the discussion over time. It is vital to teach patients about the indication for medication, why it will be helpful to them, and common side effects [11].

In addition to overcoming stigma, another challenge faced in the realm of psychopharmacology is that patients may lack insight into their mental illness. In these cases, adherence is a major problem that, if not addressed, results in a repetitive cycle of hospitalization improvement on medication discharge nonadherence to medication decline in readmission. Fortunately, effective interventions are possible to break this cycle, such as access to regular community care, working closely with family, and/or recommending a long-acting injectable. Lastly, it is also important to be aware of the cost of medications because the best medication is one that a patient can and will take. If a medication is too expensive, the added financial stress or the inability to access the medication will negate its clinical benefit. Overall, psychopharmacology is a crucial piece of psychiatry requiring medical knowledge of the medications and when to use them, but also how to overcome challenges such as stigma, nonadherence, and cost to deliver the best care to the patient (Figs. 1.4 and 1.5) [11].

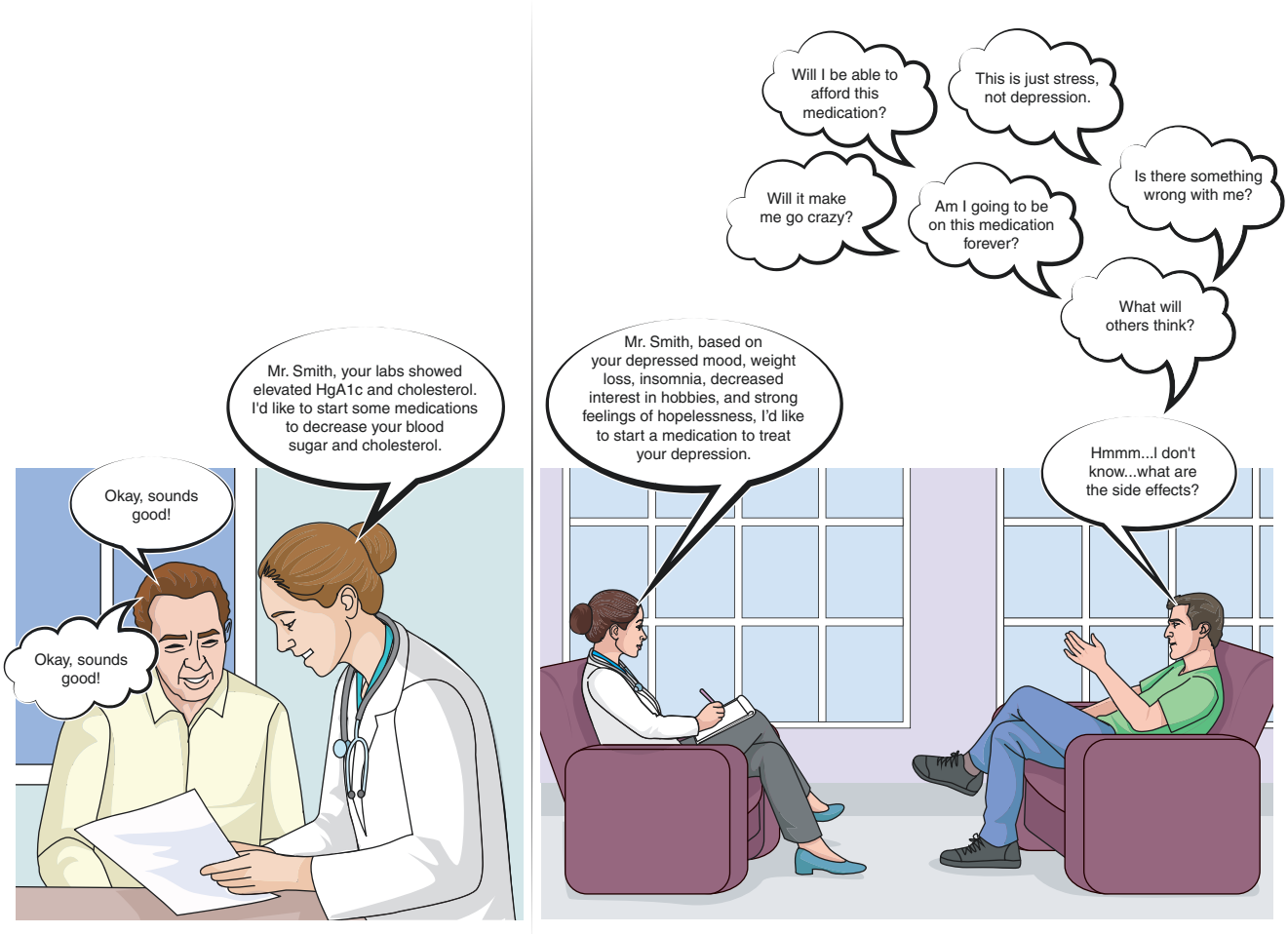


Fig. 1.4 Psychiatric medication conversation versus that in other specialties

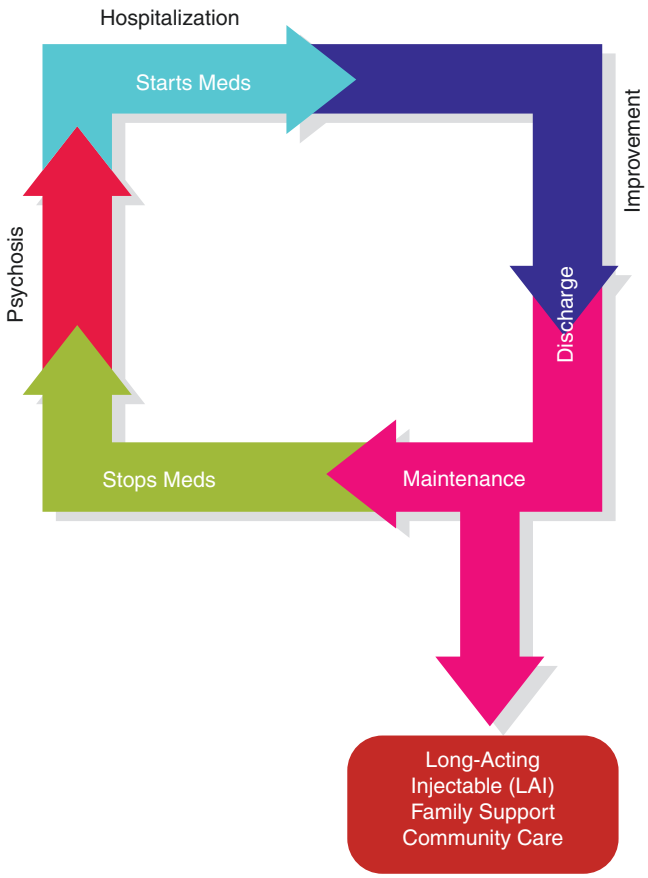


Fig. 1.5 Pharmacology and psychosis cycle

Interventional Psychiatry

Interventional psychiatry utilizes modalities such as electroconvulsive therapy, magnetic seizure therapy, transcranial magnetic stimulation, or ketamine/esketamine to treat psychiatric conditions, especially treatment resistant-depression. Some interventions are aimed at the induction of seizures, while others intervene through more focused stimulation of areas of the brain. Growing an understanding of circuit dysfunction (how different focal areas of the brain interact) is central to the development work in neurostimulation. This is an exciting area of psychiatric practice, offering novel ways to ameliorate and treat psychiatric illness.

We are still in the early days of interventional psychiatry, with new modalities continuing to appear and optimal use of older modalities still being defined. It has long been appreciated that ECT is one of the most effective treatments for depression, but it is not risk-free. Some patients have significant cognitive side effects. However, MST has been shown to be just as effective as ECT, with fewer memory effects [12]. There is still much work to be done in studying the frequency of treatments and the intensity of treatments for optimum recovery in the areas of interventional psychiatry (Fig. 1.6).

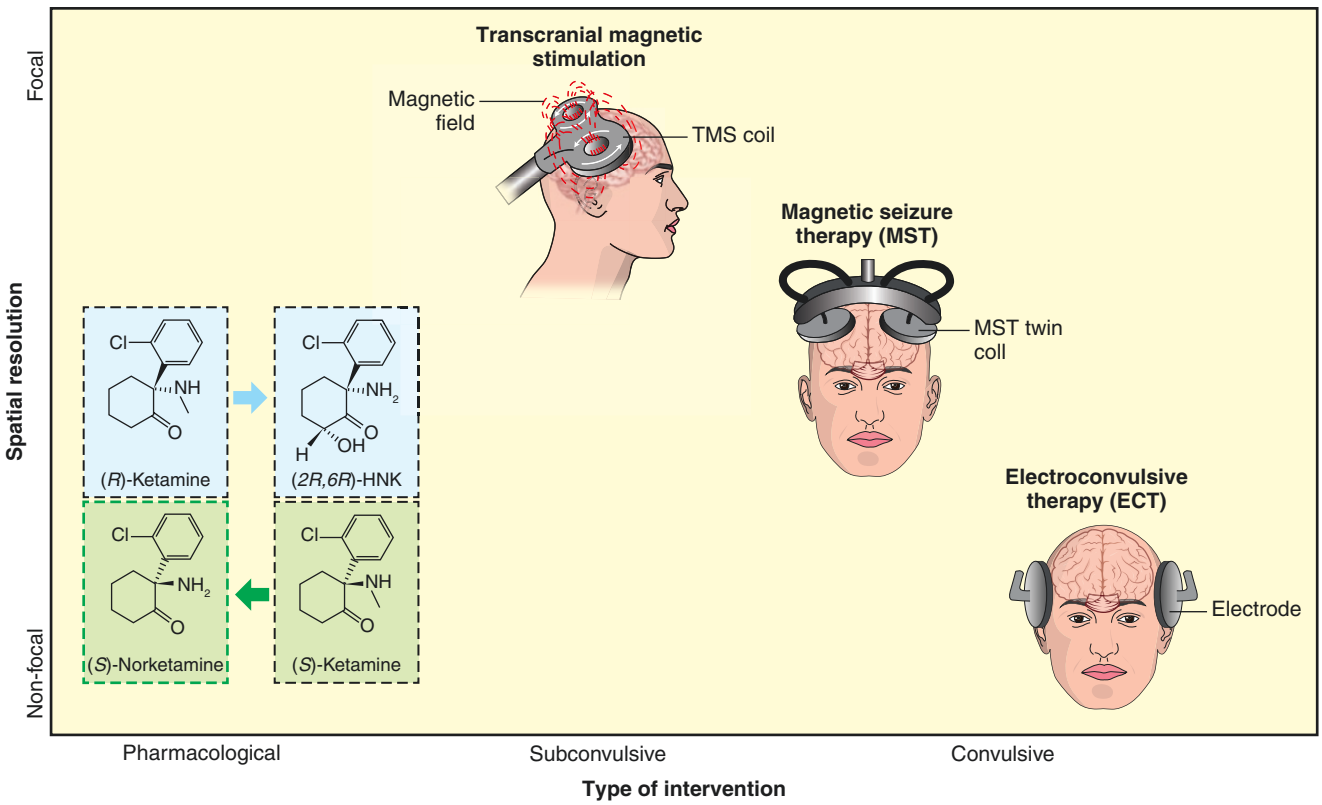


Fig. 1.6 Interventional Psychiatry treatments. (*From* Hashimoto et al. [13]; *with permission*)

Neuroscience

The Diagnostic and Statistical Manual of Mental Disorders (DSM) was written to standardize diagnoses across the country and minimize subjectivity. This yielded reliability in diagnosis, but did these diagnostic criteria accurately reflect underlying pathology in the brain or specific genetic abnormalities? Psychiatric illnesses are often called syndromes in that they usually present with common clinical symptoms, but the exact cause of the constellation of symptoms may be different or unknown [14]. Schizophrenia, for example, can present in a variety of ways with high interindividual variability. Such variability often calls into question whether it is one illness or several different illnesses that have not yet been differentiated. Genetics research into DSM disorders has repeatedly found that a given disorder might be associated—though weakly—with genetic polymorphisms at many sites resulting in numerous potential disease mechanisms. In addition, a particular mechanism might be found to be implicated in several different DSM disorders (Fig. 1.7) [15].

Several decades of research had accordingly produced relatively little to show in terms of defining the etiologies of psychiatric disorders. The NIMH developed a new strategy to 'deconstruct' the current disorders into intermediate areas of neurobiological function and aim research efforts at these 'domains.' This new Research Domain Criteria (RDoC) is aimed at relating core psychological processes to biological processes, with the hope that this will provide a new framework for defining the boundaries of psychiatric disorders and their subtypes based on empirical data from genetics and neuroscience. The emphasis will be on neural circuits but will extend 'downwards' to the genetic and molecular elements and 'upwards' to the level of individuals, families, and social contexts. This approach may yield progress. RDoC was applied in subjects with psychosis who would typically be diagnosed with schizophrenia. Based on a large biomarker panel, subjects were able to be classified into three categories which have become known as "biotypes" (Fig. 1.8; Table 1.1) [16, 17].

In addition to biotypes, neuroscience research is also elucidating more models to help describe behaviors and link behavior to anatomy and neural pathways within the brain. Nervous tissue varies depending on its location inside the brain. Cortical neurons and the global organization of such neurons can be seen in Fig. 1.9.

When thinking about neurons and brain connectivity, it is helpful to know what a synapse is, and what neurotransmitters are most common at these synapses. An understanding of synapses and neurotransmitters is very useful for understanding how medication and other chemical substances interfere with these biological components (Fig. 1.10; Table 1.2).

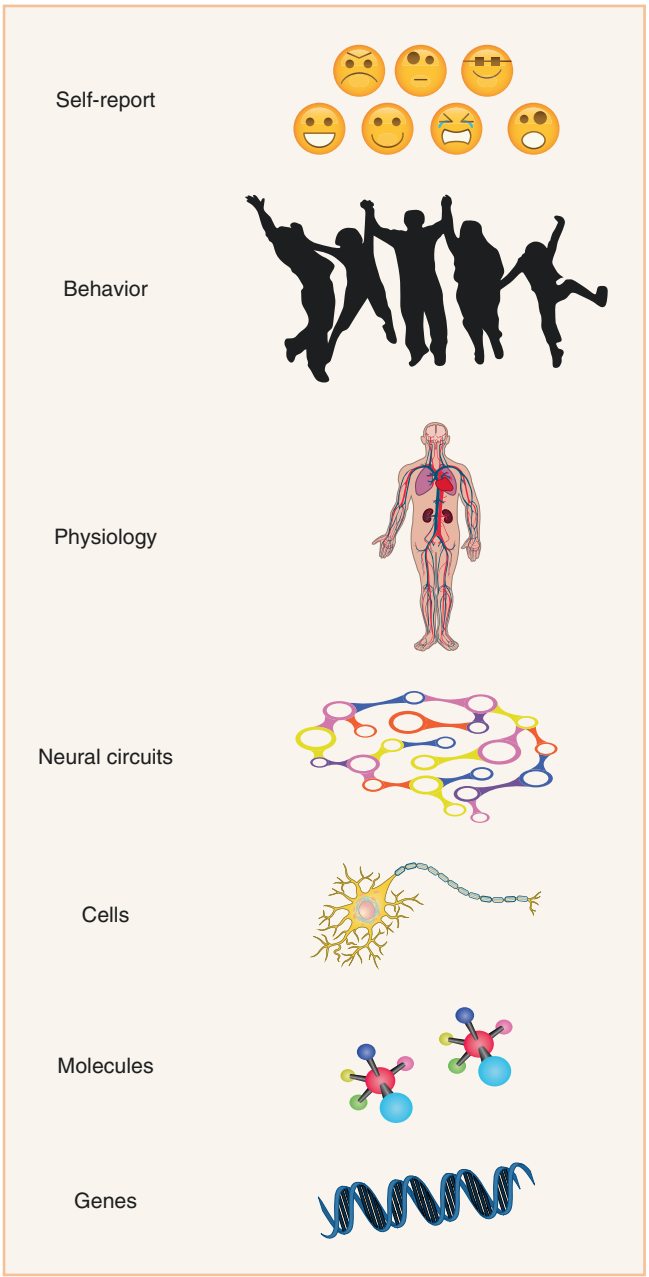


Fig. 1.7 Psychiatric factors that influence the mental illness

Another way to think about brain connectivity is to map functional areas in the cortex. Functional cortex maps today have usually been made by stimulating small areas and noting the effect. Figure 1.11 shows approximate functions of different regions of the cortex.

The human connectome project is also underway which seeks to map functional connectivity within the brain [18]. Connectomes use MRI sequences to build a wiring diagram based on water molecules diffusing across white matter tracts where spontaneous fluctuations contribute to positive and negative correlates that are then used to form a lesion

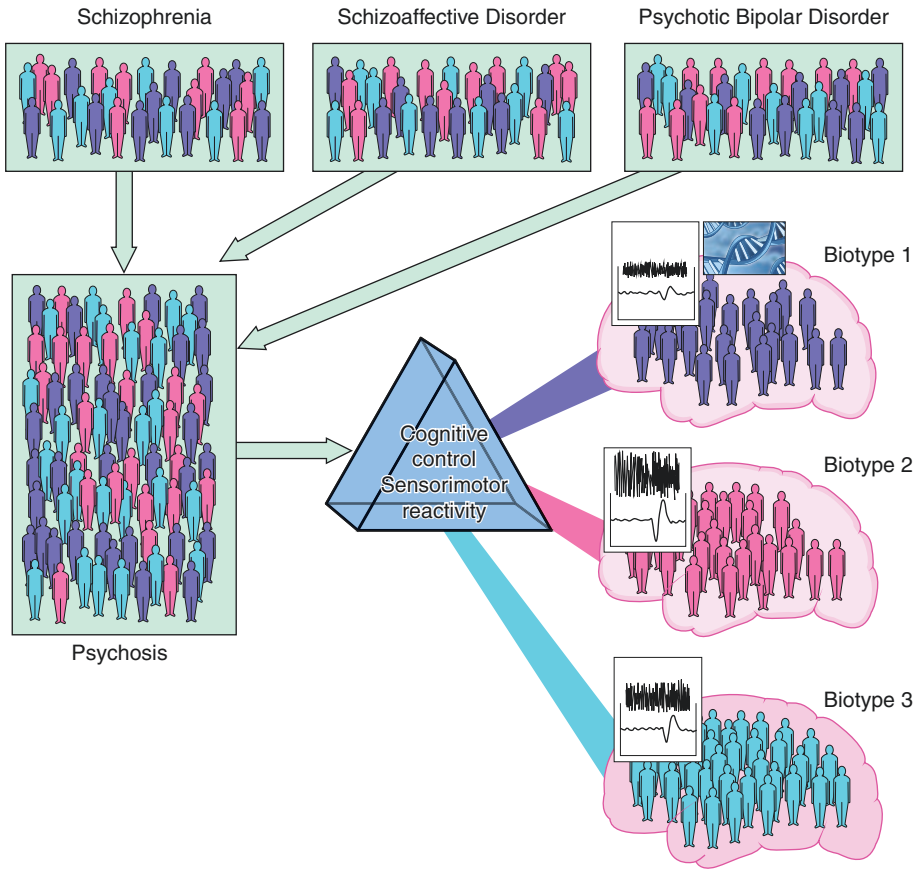


Fig. 1.8 Schema of the bipolar and schizophrenia network

Table 1.1 Summary of research domains and biologic correlates

Negative affect	**Positive affect**	**Cognition**
Fear	Reward seeking	Attention
Distress	Gratification	Perception
Aggression	Habit formation	Memory
		Executive function
Basolateral amygdala	Mesolimbic dopamine system	Parietal areas (attention)
Hippocampus	Orbital frontal cortex	Thalamic and occipital (perception)
Ventral medial prefrontal cortex	Ventral and dorsal striatum	Dorsolateral prefrontal cortex
		Hippocampus
		Anterior cingulate
Social processes	**Regulatory systems**	**Sensorimotor systems**
Attachment	Arousal	Motor actions
Parenting	Sleep	Agency
Separation anxiety	Circadian rhythms	Habit
Facial recognition		Innate motor patterns
Oxytocin	Reticular activating systems	Inferior parietal cortex
Vasopressin	Ventral tegmental area	Posterior parietal cortex
	Locus ceruleus	Premotor cortex
		Thalamus
		Cerebellum
		Somatosensory cortex
		Sensorimotor basal ganglia
		Hypothalamus
		Motor cortex
		Brainstem
		Occulomotor system

From Tamminga et al. [16]; with permission

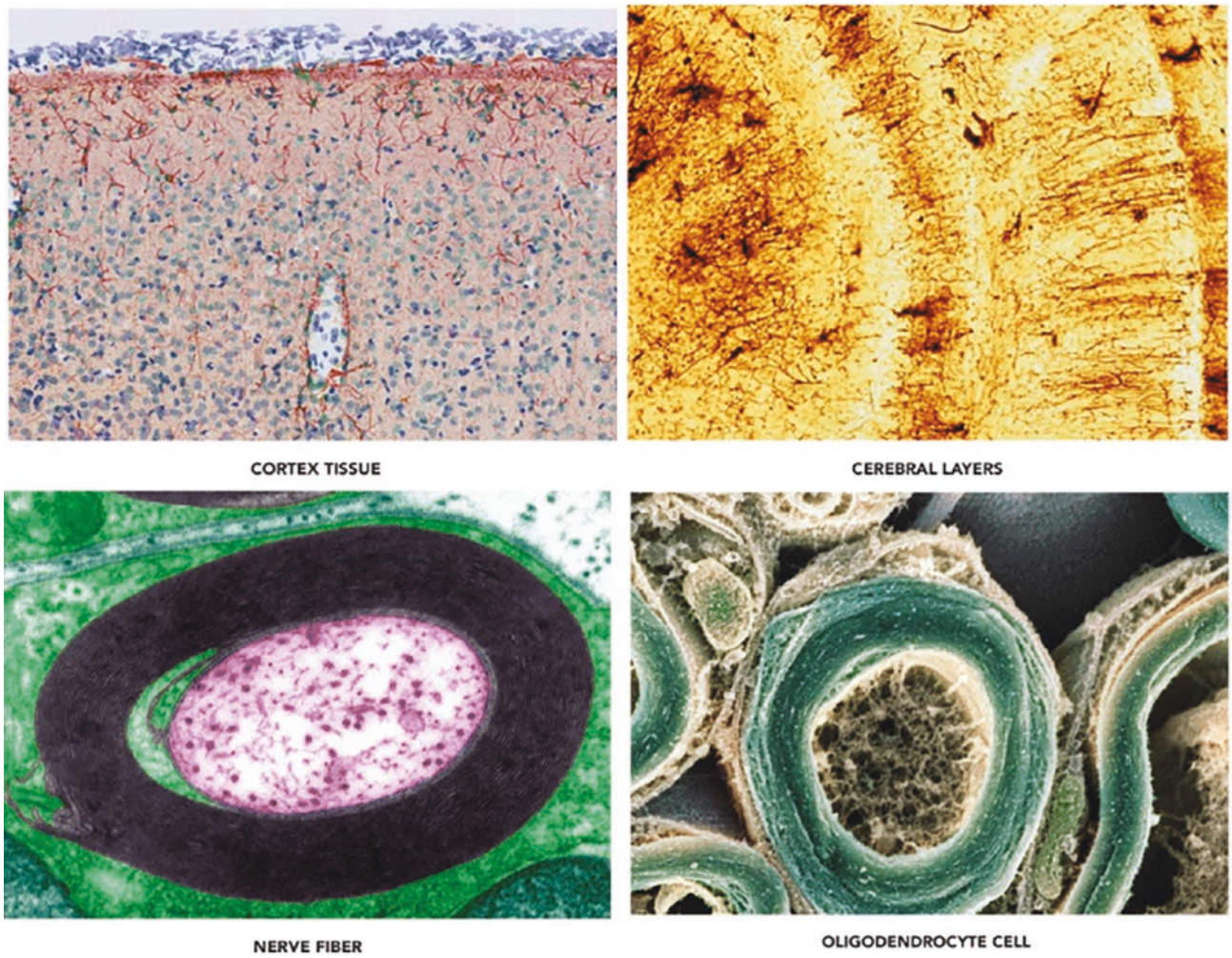


Fig. 1.9 Cortical and cerebral tissue

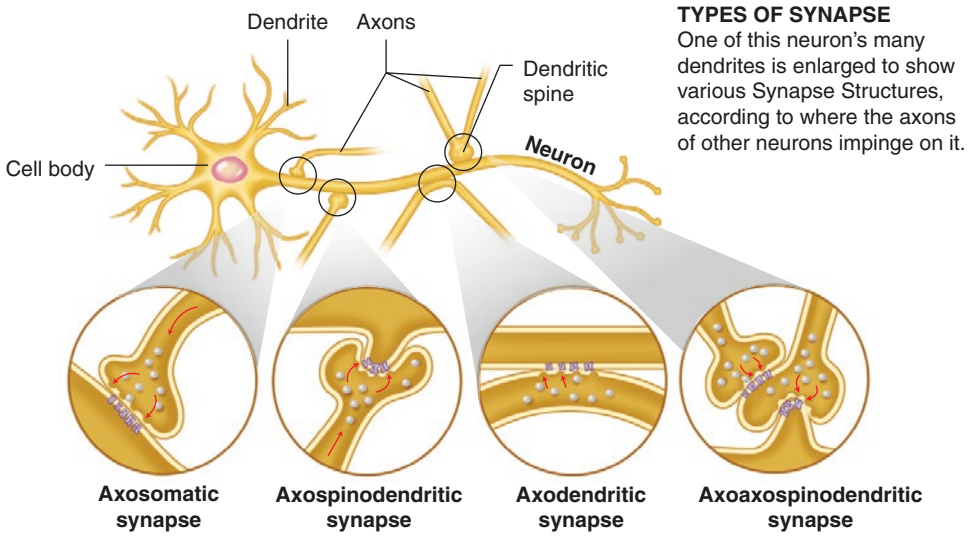
network with the goal of localizing neuropsychiatric symptoms (Fig. 1.12). Figure 1.13 shows the process by which connectomes are created. Data is obtained from MRI images. Images are labeled with five tissue types which are used to create a fiber orientation distribution (FOD) that is then used to create tractograms using anatomical constraints. A connectivity matrix is generated from the tractogram and network-based statistics test for the white matter connectivity effects [19].

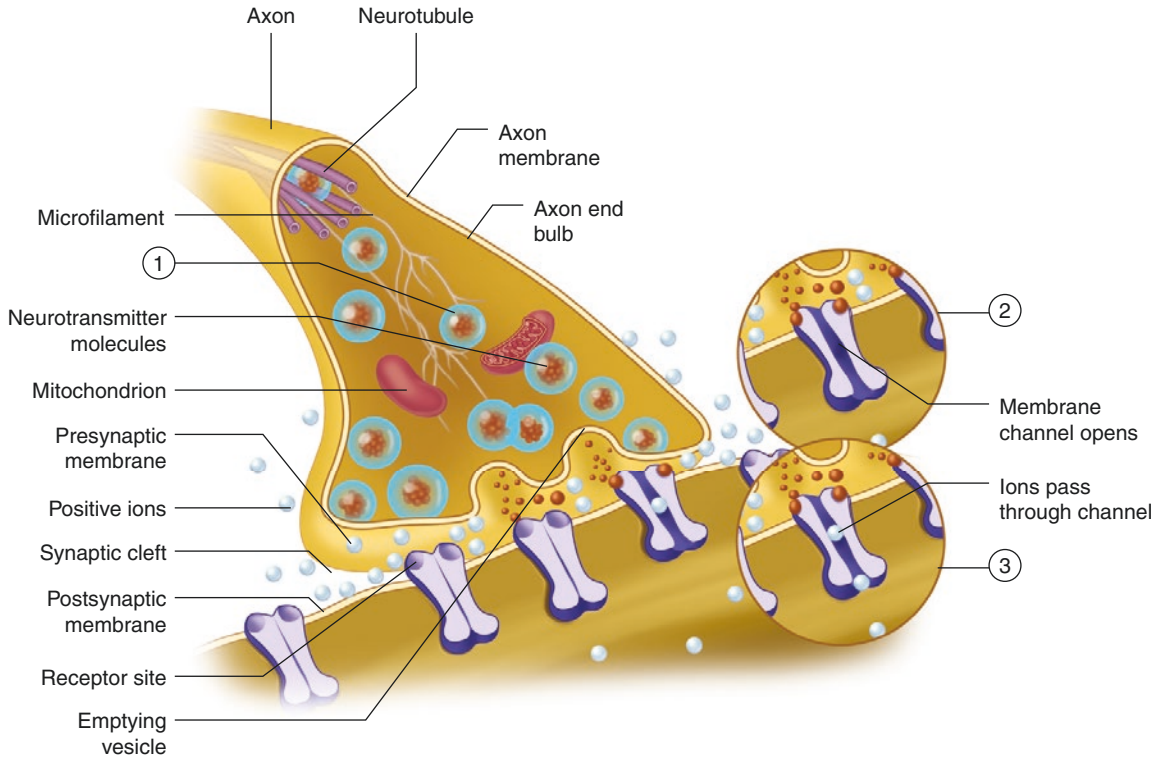
One of the major systems that concern psychiatry is the limbic system shown in Fig. 1.14.

The limbic system is associated with basic emotional and motivational processes such as anger, pleasure, sex, and general survival. It consists of the limbic lobe (cingulate gyrus, cingulate sulcus, and parahippocampal gyrus), hippocampus, amygdala, hypothalamus, mammillary bodies, thalamus, and fornix. Neurons in the limbic system also extend down into the brainstem and into other areas of the brain such as the frontal cortex. Sensory neurons of the olfactory system are also linked to the limbic system and influence memory formation and bring olfactory sensation into consciousness. These structures are explained in more detail in Fig. 1.15.

Emotions are thought to arise in the amygdala, brainstem, and hypothalamus. An anatomic correlation with how emotions may be initiated, expressed, and become conscious is illustrated in Fig. 1.16. The frontal lobe is one area involved in maintaining consciousness.

The amygdala can be considered the emotional "sensor" of the brain. It receives emotional inputs from the rest of the body, cortex, sensory cells, and hypothalamus. When the amygdala fires, it sends information through the emotional circuit shown in Fig. 1.17 and causes physical changes in the body. Input from the frontal lobe evokes conscious awareness of emotions. Positive emotions follow a slightly separate circuit to include an area of the brainstem to produce dopamine and a sense of positive reinforcement [20]. The amygdala's role in whether sensory information becomes conscious or not is depicted in Fig. 1.18. The figure shows two routes, a slow and accurate route, and a quick route. The





1.) Synaptic vesicles store neurotransmitters for release into the synaptic cleft. Neurotransmitters are produced in the neural soma and transported through neurotubules to the axon to be stored in the synaptic vesicles.

2.) Synaptic vesicles fuse with the axon end bulb membrane when signalled by an action potential to release the neurotransmitter molecules into the synaptic cleft. The neurotransmitters diffuse across the cleft to the post-synaptic membrane and interact with the receptor sites.

3.) Neurotransmitters fit into the post-synaptic receptor sites, opening the channels, which allow ions to pass through the channel. This flow of ions creates depolarization which if strong enough will continue the action potential that initially triggered synaptic vesicle release.

Fig. 1.10 Structure of a synapse. (1) Synaptic vesicles store neurotransmitters for release into the synaptic cleft. Neurotransmitters are produced in the neural soma and transported through neurotubules to the axon to be stored in the synaptic vesicles. (2) Synaptic vesicles fuse with the axon end bulb membrane when signaled by an action potential to release the neurotransmitter molecules into the synaptic cleft. The neurotransmitters diffuse across the cleft to the post-synaptic membrane and interact with the receptor sites. (3) Neurotransmitters fit into the post-synaptic receptor sites, opening the channels, which allow ions to pass through the channel. This flow of ions creates depolarization which if strong enough, will continue the action potential that initially triggered synaptic vesicle release

Table 1.2 Common neurotransmitters and their post-synaptic effects [20]

Inhibitory	Excitatory and inhibitory	Mostly excitatory	Excitatory
Serotonin	Dopamine	Acetylcholine	Glutamate
Glycine		Noradrenaline	Aspartate
Gamma aminobutyric acid (GABA)			Histamine

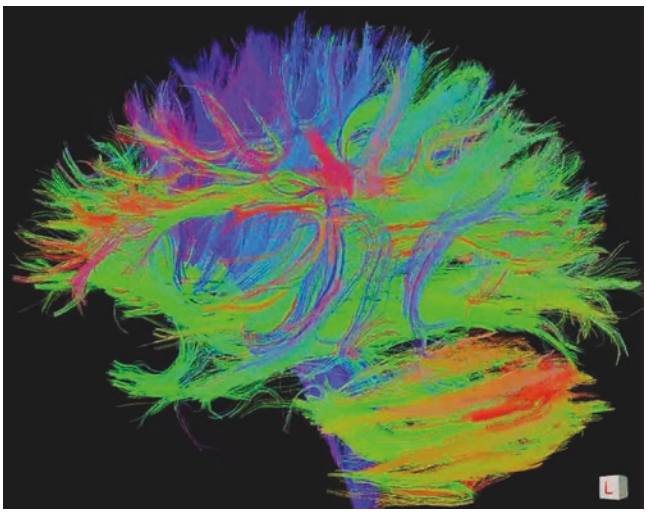


Fig. 1.12 Sagittal view of human connectome or tractogram (*From* Wikicommons. Author jgmarcelino from Newcastle upon Tyne, UK. 22 April 2010. https://creativecommons.org/licenses/by/2.0/deed.en. No changes)

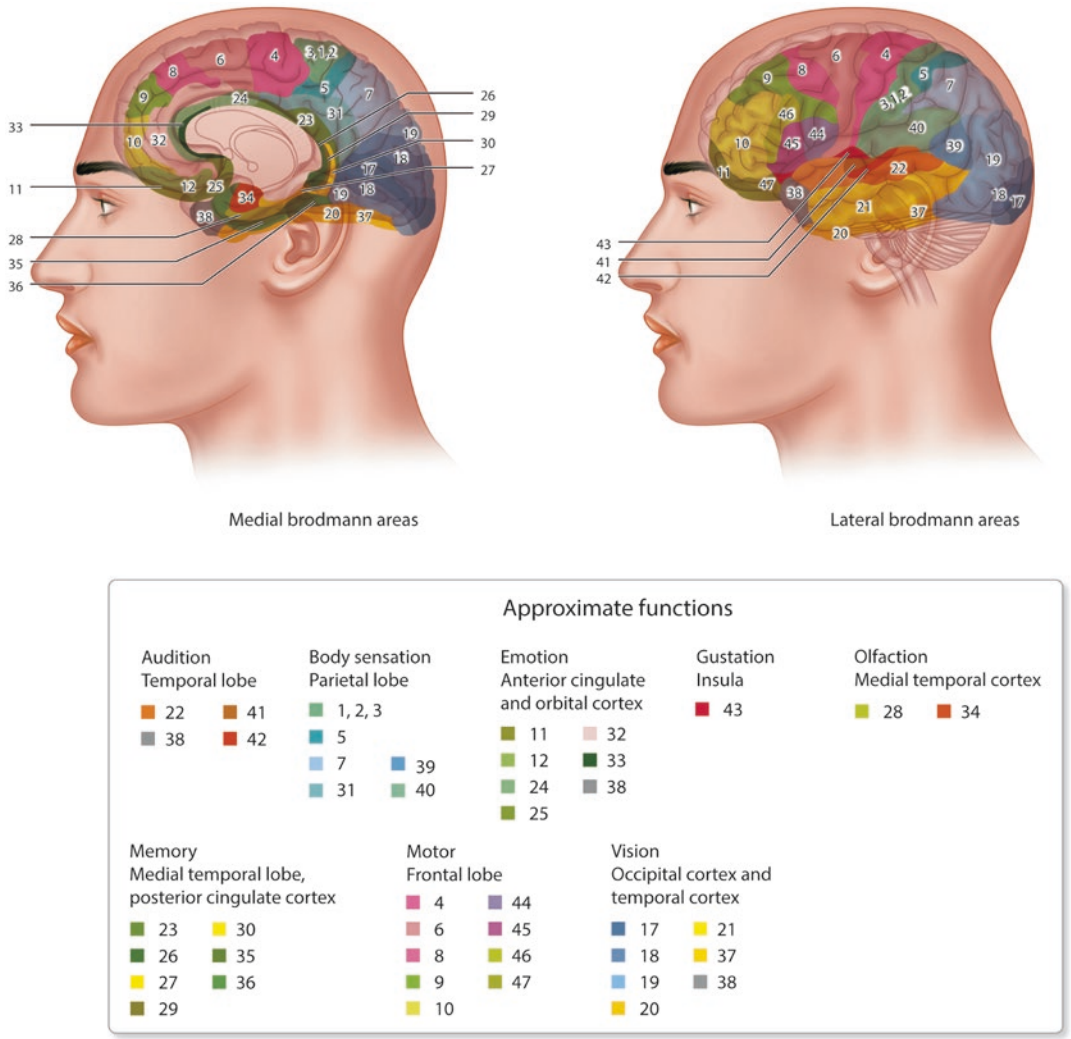


Fig. 1.11 Functional areas of the brain. The medial brodmann areas link areas that are associated with hearing, vision, memory, emotional insight, and emotional reactions. The lateral brodmann areas include Broca's area and are based on nerve-cell body arrangements

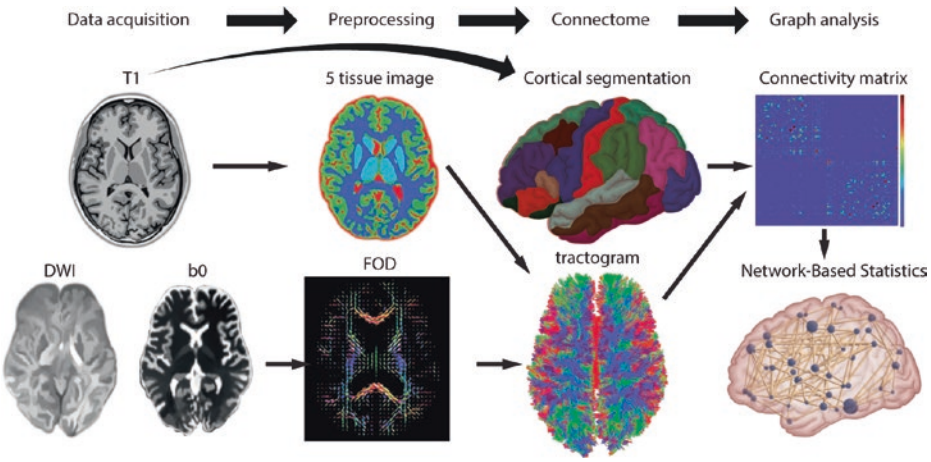


Fig. 1.13 Process of creating a connectome

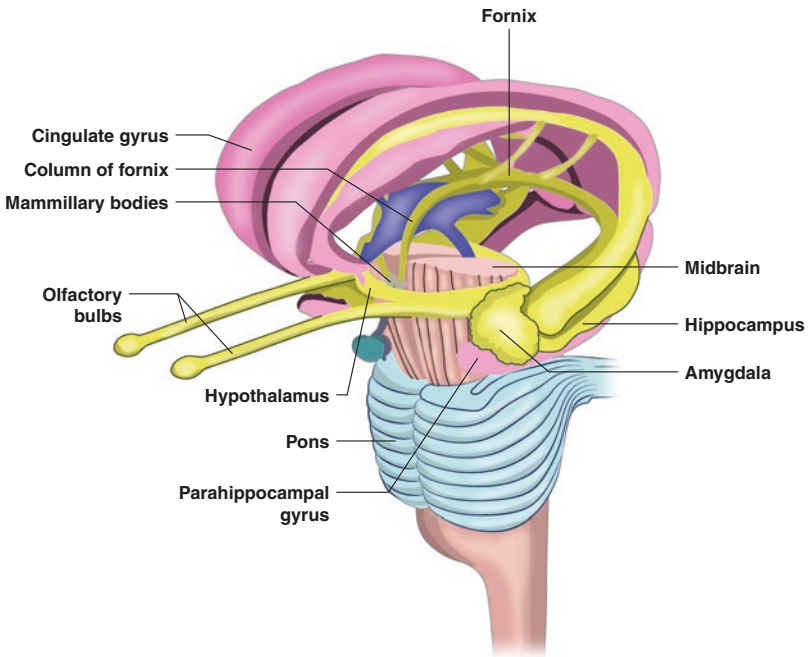
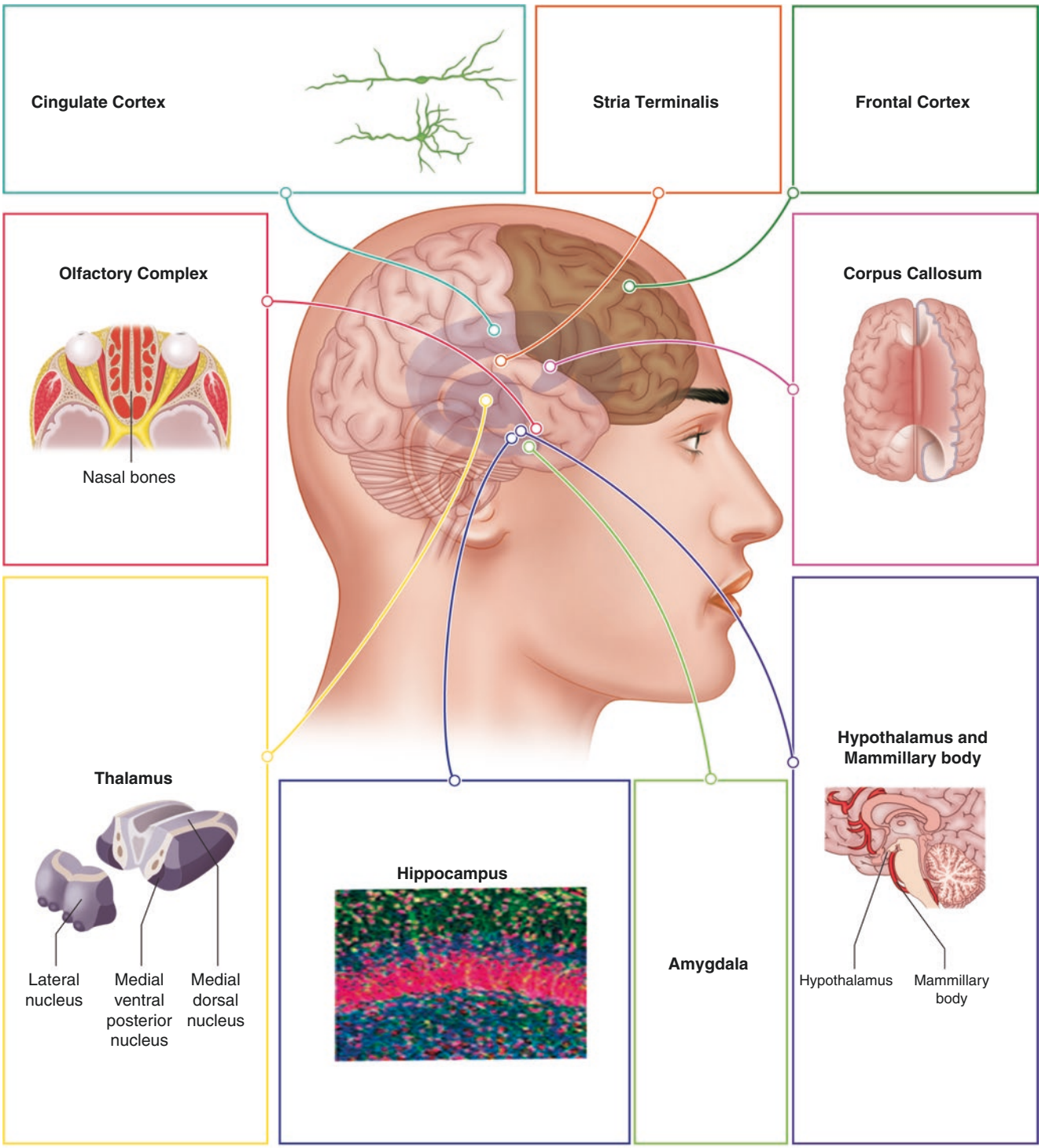


Fig. 1.14 Anatomy of the limbic system

Fig. 1.15 A focus on structures of the limbic system. **Cingulate Cortex:** The cingulate cortex shares extensive neural pathways with other brain regions. It is involved in motivational processing as it connects to the reward centers of the brain (orbitofrontal cortex, basal ganglia, and insula). It also contributes to orienting attention, consolidation of long-term memory, and processing of emotionally relevant stimuli [21]. **Stria Terminalis:** Pathways from the stria terminalis link the amygdala to the rest of the brain and play a role in anxiety and stress responses [21]. **Frontal Cortex:** The frontal cortex works in conjunction with the limbic system to produce conscious feelings. It then modifies these emotions to fit socially acceptable norms. It is also considered the "action cortex" as it contributes to skeletal and ocular movement as well as speech control. The prefrontal cortex is the largest part of the frontal cortex and is responsible for reasoning [22]. **Olfactory Complex:** Olfactory bulbs carry information directly to the amygdala and hypothalamus to mediate behavioral, emotional, motivational, and physiological effects of odors and smell. Information is also projected through the thalamus to the orbitofrontal cortex to help with the perception and discrimination of odors [23]. **Thalamus:** The thalamus is a structure located near the center of the brain, which allows for nerve fiber connections to the cerebral cortex in all directions. It is a major relay station filtering information between the brain and body. Its connection to the limbic system allows the thalamus to be involved in learning and episodic memory. It is also involved in sleep regulation and wakefulness. The thalamus is divided into five major functional components: reticular and intralaminar nuclei (arousal, pain), sensory nuclei (medial geniculate nucleus for auditory, lateral geniculate nucleus for visual, and ventrobasal complex for somatosensory and vestibular), effector nuclei (motor language), associative nuclei (cognitive functions), and limbic nuclei (mood and motivation) [24]. **Hippocampus:** The hippocampus plays a crucial role in the storage and retrieval of episodic memories. Episodic memory is recollections about a specific event occurring at a certain time and place. Patients with hippocampal damage struggle to create new episodic memories [25]. **Amygdala:** The amygdala receives afferent input from many sites within the brain, including the olfactory bulb, olfactory nucleus, medial frontal cortex, dorsomedial thalamic nucleus, hypothalamus, and dorsal raphe nuclei. These sites provide internal and external information that contribute to threat analysis and emotional responses. The amygdala plays a role in acquired and innate emotional reactions, particularly fear, anxiety, and rewarding properties of stimuli [23]. **Corpus Callosum:** The corpus callosum facilitates communication between the left and right hemispheres. Hypothalamus and mammillary body: The hypothalamus integrates autonomic response and endocrine function with behavior concerned with controlling blood pressure, body temperature, drive for water or salt, emergency responses to stress, energy metabolism, and hormonal control. The mammillary bodies assist with recollective memory, emotion, and goal-directed behaviors [26]


Cingulate Cortex
Stria Terminalis
Frontal Cortex
Olfactory Complex
Nasal bones
Corpus Callosum
Thalamus
Lateral nucleus
Medial ventral posterior nucleus
Medial dorsal nucleus
Hippocampus
Amygdala
Hypothalamus and Mammillary body
Hypothalamus
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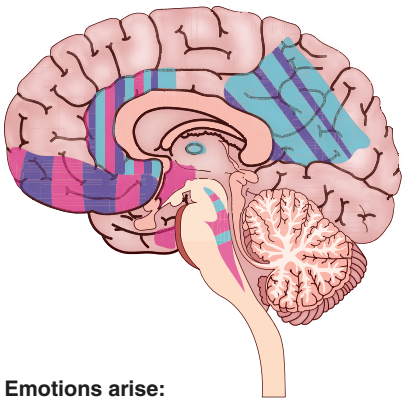
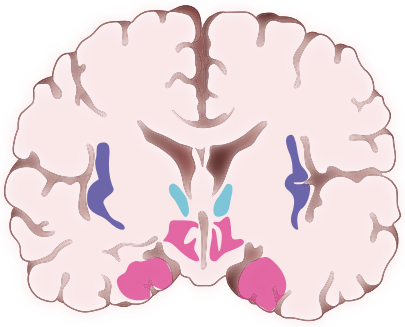
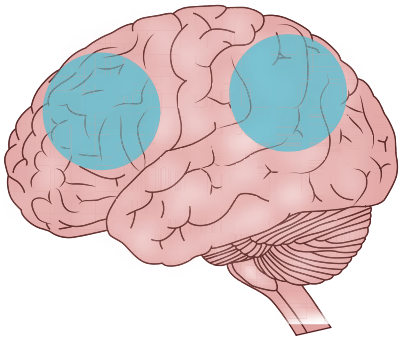


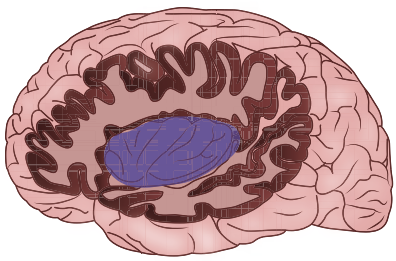
Emotions arise:
The amygdala, hypothalamus and brainstem give rise to emotion that is not yet conscious. The orbitofrontal and cingulate cortex contribute to conscious feelings.



Conscious expression
The amygdala and hypothalamus (blue) are active in expressing emotion, while the thalarnus (green) maintains consciousness.



Emotions expressed:
The thalamus in conjunction with the amygdala and hypothalamus ensure that emotions remain conscious.



Disgust
This cutaway shows the insula (red–also in top scan), part of which is active during the generation of emotion. particularly disgust.

Fig. 1.16 Anatomical representation of the expression of emotions

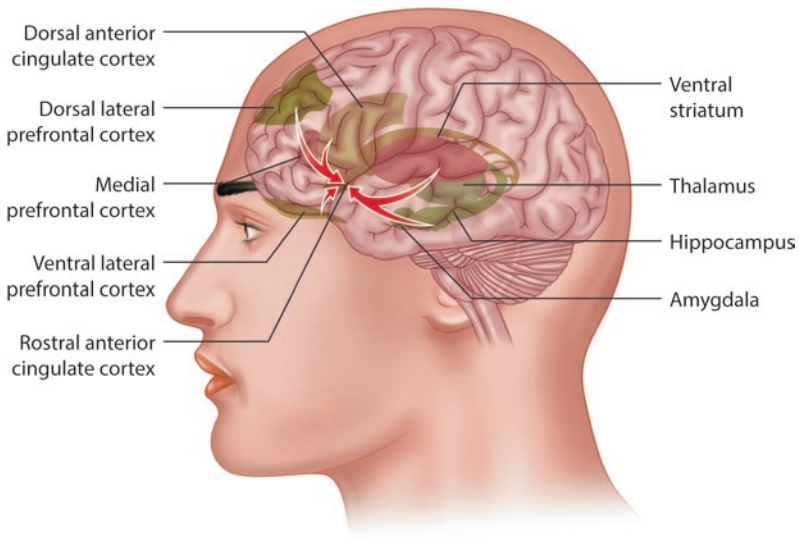


Fig. 1.17 Processing emotions through an emotion circuit in the brain

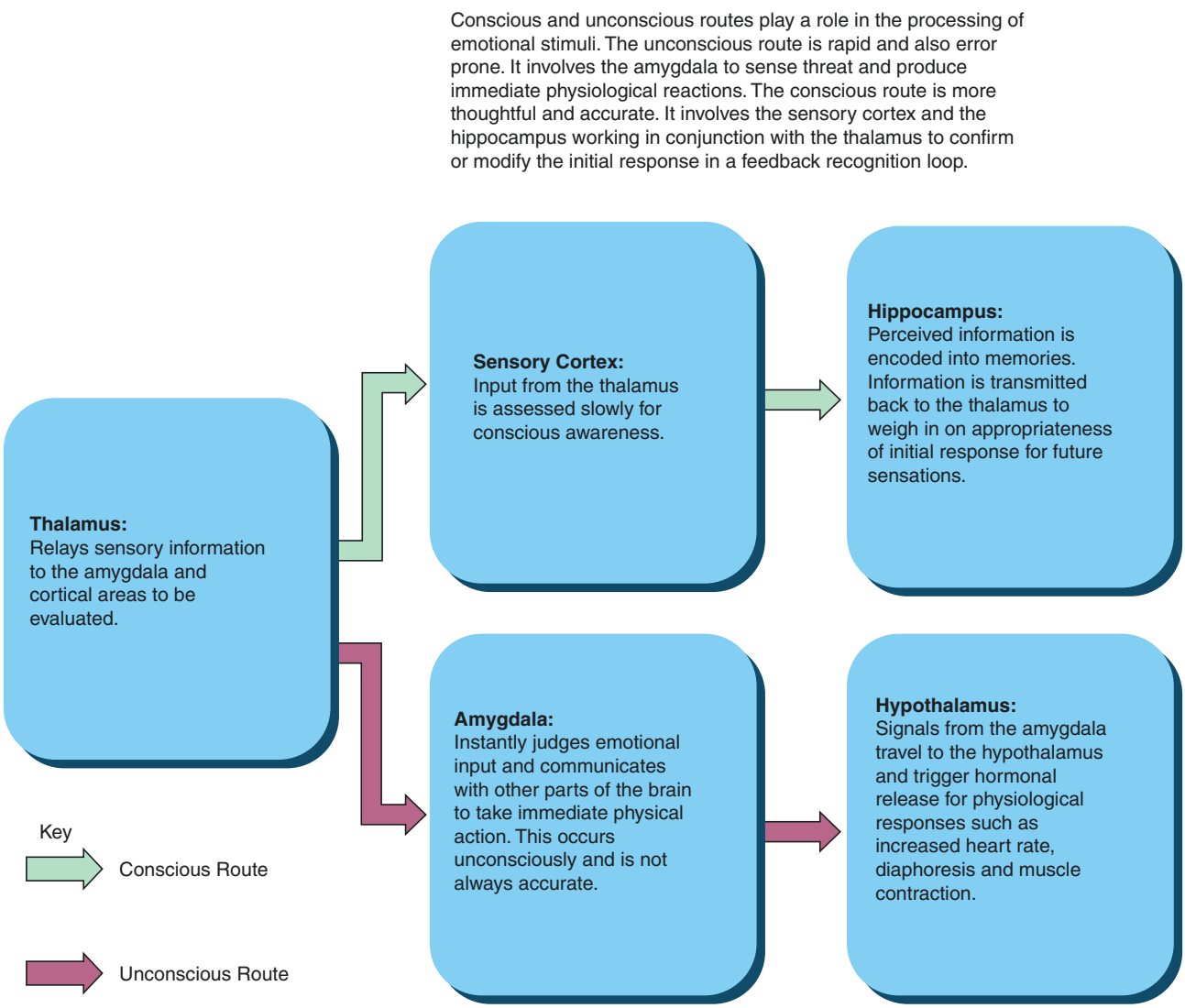


Fig. 1.18 Conscious and unconscious routes

quick route is in place to react very quickly to threats or rewards which involves the amygdala. The slow route is processed through the frontal lobes and is more thoughtful.

In addition to the limbic system, another important region of the brain is the insula. The insula is thought to be responsible for the feeling of "self" and the ability to distinguish ourselves from others. In being aware of others, the insula also plays a role in triggering empathic feelings. fMRI scans had shown insula activity when participants watched another person in pain. This phenomenon is shown in Fig. 1.19. The insula also works as part of the process of bringing our emotional state into consciousness.

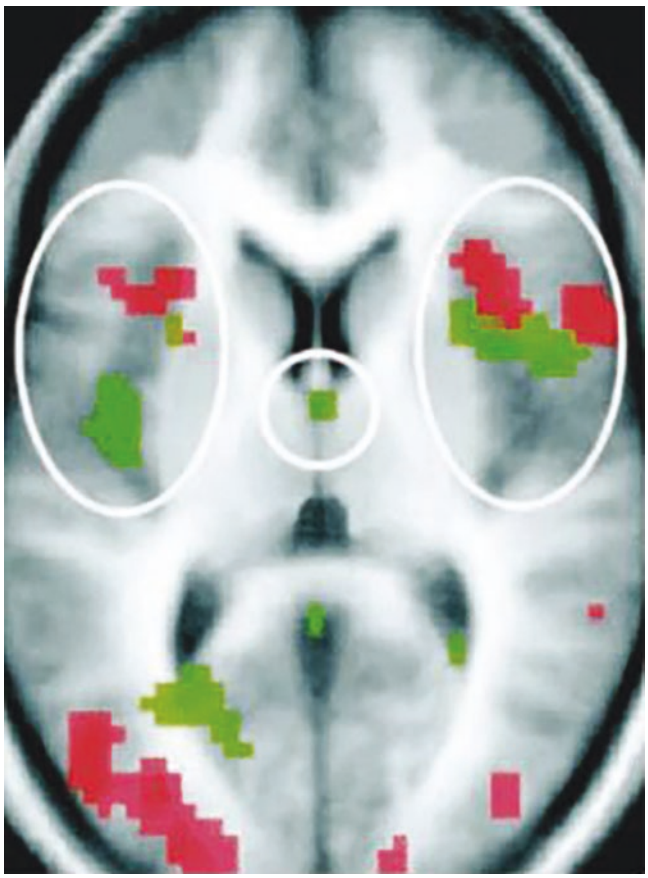


Fig. 1.19 fMRI showing insula activity when participants witnessed another individual in pain

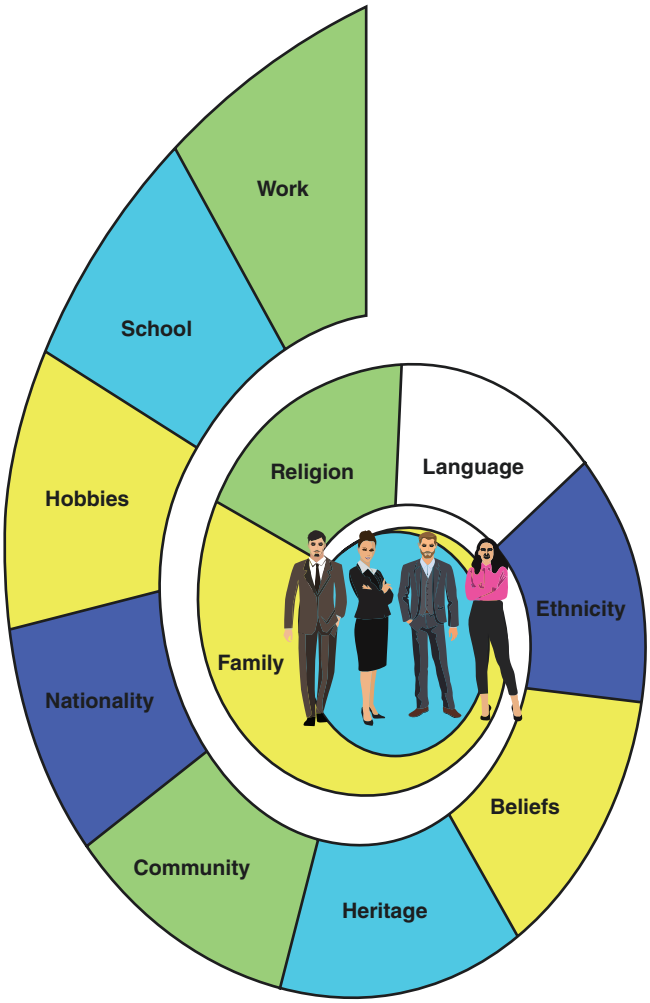


Fig. 1.20 Cultural factors

Culture and Society

Treating mental illness requires more than knowing the psychopathology, psychopharmacology, or presentation of an illness. The missing piece is knowledge about the context within which the illness arose. We have a growing evidence base demonstrating that childhood trauma and deprivation lead to adult psychiatric illnesses and that the social environment has an enormous impact on whether and how adults recover from serious mental illness. Different racial and ethnic communities are subject to very different exposure to these 'social determinants of mental health,' leading to significant disparities and inequities in mental health and treatments [27]. In addition, humans are interpersonal creatures, and our close attachments shape our development and impact our health throughout our lives. Friendship has been shown to decrease inflammation and extend longevity [28]. While we see an individual patient in our office, it is important to realize that each patient is a member of a complex network of relationships that further exist within a larger societal structure ruled by various cultural dynamics (Fig. 1.20) [29].

Pathology often arises out of isolation or when an individual begins to struggle to function within the cultural and societal framework. This should not be surprising—the human brain and human culture co-evolved over millennia, creating a new kind of primate that was both gifted at and dependent on accumulated social learning. Different social structures and cultures have a profound impact on the prevalence and presentation of many psychiatric illnesses. As psychiatrists, we often see patients afflicted by environments so harsh or isolation so intense that medication will do very little to improve their psyche (Fig. 1.21).

It is only when their environment improves or they gain more support in their life that change occurs. In this way, we see that relationships can help or hinder a person's growth and well-being. When treating patients from a culture different from your own—and even your own, it is also important to be both humble and curious and know that false assumptions can be made that might lead to the wrong diagnosis and ineffective treatment. The DSM encourages the use of the

Fig. 1.21 Child trauma has a lasting effect

cultural formulation to thoroughly explore cultural factors with patients to ensure that patients are well understood so that an individualized treatment plan can be established [30].

Narrative Meaning and Psychotherapy

A unique aspect of human beings, compared to all other social animals, is our use of language to create narrative meaning from our experiences. Each patient's experience of childhood adversities or social determinants of mental health is unique because what it meant to them subjectively cannot be understood without careful listening. Similarly, each patient with a serious mental illness has a powerful story to tell of how their identity, relationships, and hopes for the future have been impacted. Psychiatrists learn how to listen carefully to their patients to integrate this subjective dimension into their understanding of the patient's condition. At the same time, connecting with the patient's story is one of the most powerful ways to build an effective treatment alliance (Fig. 1.22) [31].

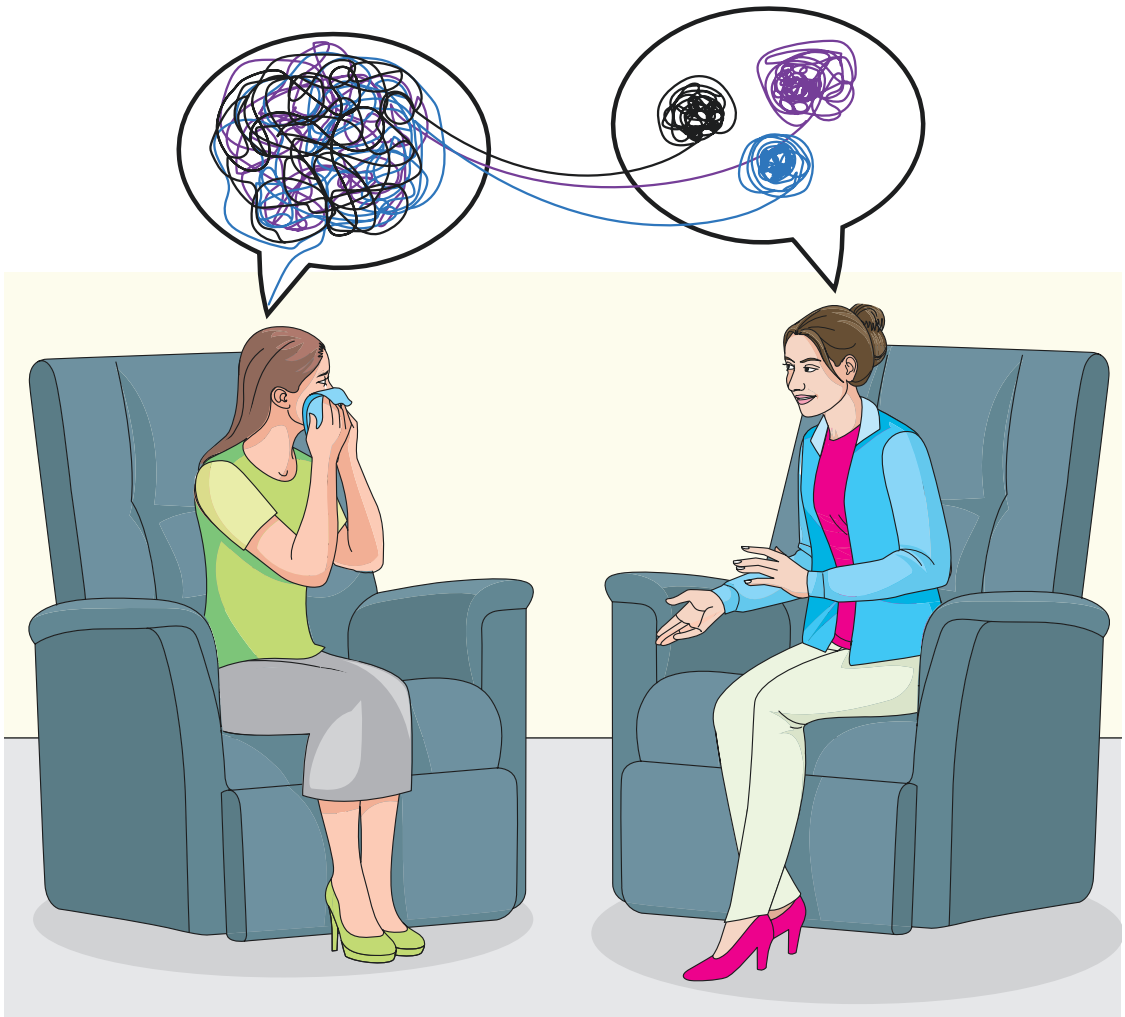


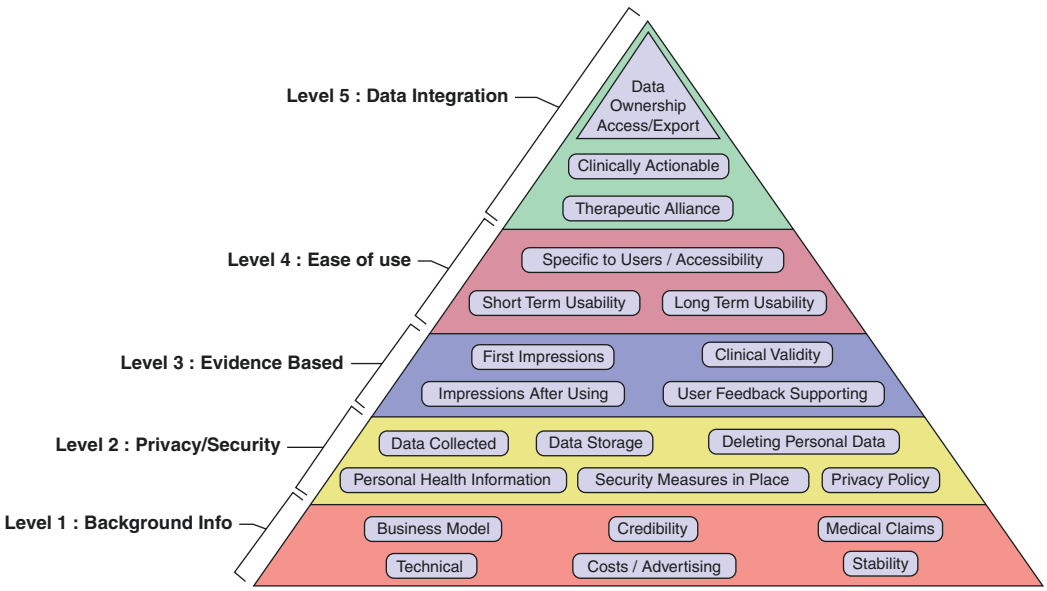
Fig. 1.22 Psychiatrist listening to a patient

Technology

Technology can be both a blessing and a curse. As new technologies are created, new opportunities to study how they influence our mental health also arise as well as new ethical dilemmas. While computers have made information more convenient and accessible than ever before, online gaming and social media introduce new challenges, as many users are finding some of these sites highly addictive. What implications will this have on the future and on the mental health of children and adolescents? Social media and mobile phone apps not only provide information with one swipe but also collect information just as easily. What do your online use patterns tell us about your mental health? How ethical is it to collect this anonymously and utilize it for research, marketing, or health care? With the creation of more technology, we must also think about how it may be influencing our community and us.

Another area of innovation and development is in the arena of mobile phone applications. There are already many apps in the marketplace that say they promote mental wellness by offering meditation, CBT, journaling, mood tracking, and even smoking cessation. The effectiveness of these apps and whether they are beneficial or not remains to be seen and is an area of active research. For any app, it is important to evaluate it, considering your overall goal, privacy settings, evidence, and usability of the app. This method is described in more detail on the APA website and is known as the app evaluation model (Fig. 1.23) [32, 33].

Technology is expanding to offer new mental health treatments, but as always, ethics and evidence must take priority to avoid repeating the mistakes of the past.



Level 1 : Background Info

- Does the app identify funding sources and conflicts of interest?
- Does the app identify ownership?
- Does the app come from a legitimate source?
- Where does app info originate?
- Are there additonal or hidden costs?
- Does the app need an active internet connection?
- On what plaforms does the app operate?
- Has the app been updated in the last 180 days?

Level 2 : Privacy/Security

- Is there a privacy policy?
- Does the app declare data use and purpose?
- Does the app describe use of PHI?
- Can you opt out of data collection or delete data?
- Are data maintained on the device or the web?
- Does the app explain security systems used?

Level 3 : Evidence Based

- Does the app do what it claims to do?
- Is app content correct, well-written and relevant?
- Are references included with the app?
- Is there evidence of benefit from end user feedback?

Level 4 : Ease of use

- Are there potential barriers to access?
- Can the user easily understand how to use the app?
- Is the app easy to use on a long-term basis?
- Does the app clearly define its functional scope?

Level 5 : Data Integration

- Do you own your data?
- Can you easily access your data?
- Can you easily share your data?
- Does the app lead to any postive behavior change?
- Does the app improve therapeutic alliance between patient and provider?

Fig. 1.23 App Evaluation model (*From* Lagan et al. [32]; Creative Commons Attribution 4.0 International License, http://creativecommons.org/licenses/by/4.0/)

Subspecialties of Psychiatry

Entering a career in psychiatry means choosing to work in a field that is still forming, growing, and constantly reassessing its identity. Psychiatrists often report greater career satisfaction and lower levels of burnout compared to other specialties. It is highly customizable with options to further specialize by doing a fellowship after completing residency.

Addiction Psychiatry

In 2014, it was estimated that 20.1 million adults in the United States have a substance use disorder, and of those, about 7.9 million adults have both a substance use disorder and mental illness [34]. The COVID-19 pandemic has also greatly affected those with substance use disorders. According to the CDC, over 81,000 drug overdose deaths have occurred in the United States from June 2019 to May 2020. This is the highest number of overdose deaths ever recorded in a 12-month period and is thought to be due to the covid-19 pandemic (Fig. 1.24) [35].

Addiction psychiatry focuses on helping individuals compelled to use addictive chemical substances despite the adverse consequences that severely limit their function, relationships, and mental health. Addiction psychiatrists are trained in understanding the psychosocial, environmental, and genetic factors that all play a role in addiction. They prescribe medications such as naltrexone or opioid replacement therapies, which have shown to be effective in reducing cravings and compulsive use. Addiction psychiatry fellows learn how to effectively combine medication, psychotherapy, and motivational interviewing to be optimally effective in helping patients with addiction recover. The alcoholics anonymous model is free and welcoming to all. It is one of the most effective paths to abstinence and lowers health care costs. There are over two million members in AA worldwide (Fig. 1.25) [35].

Child and Adolescent Psychiatry

The CDC reports that 1 in 6 children aged 2–8 has a mental, behavioral, or developmental disorder. The percentage of children diagnosed with depression or anxiety between the ages of 2–17 increases each year. As children age, it becomes more common to receive a diagnosis of depression or anxiety (Fig. 1.26).

Child and adolescent psychiatrists work with children and their families to effectively manage and treat mental, behavioral, and developmental disorders. Early diagnosis and treatment of children with these conditions can make all the difference in their quality of life going forward. Childhood symptoms can differ from those that appear in adult mental illness. It is important to recognize moderate to severe symptoms that persist over time that may indicate either progression towards a mental illness or neurobiological disorder. Symptoms in children can change, overlap, and appear very different from those found in adults. Figure 1.27 shows how the brain continues developing throughout childhood to adulthood, a likely contributor to these differences.

The National Institute of Mental Health (NIMH) recommends that children with depression plus severe attention deficit hyperactivity disorder (ADHD) symptoms such as mood changes and temper outbursts be evaluated for bipolar disorder [36]. Figure 1.28 shows a SPECT scan of a 7-year-old boy with enlarged ventricles and symptoms of irritability, paranoia, and auditory and visual hallucinations. At the time of imaging, he was diagnosed with Bipolar I, but due to the enlarged ventricles and thought disorder, the schizoaffective disorder may also be likely [36].

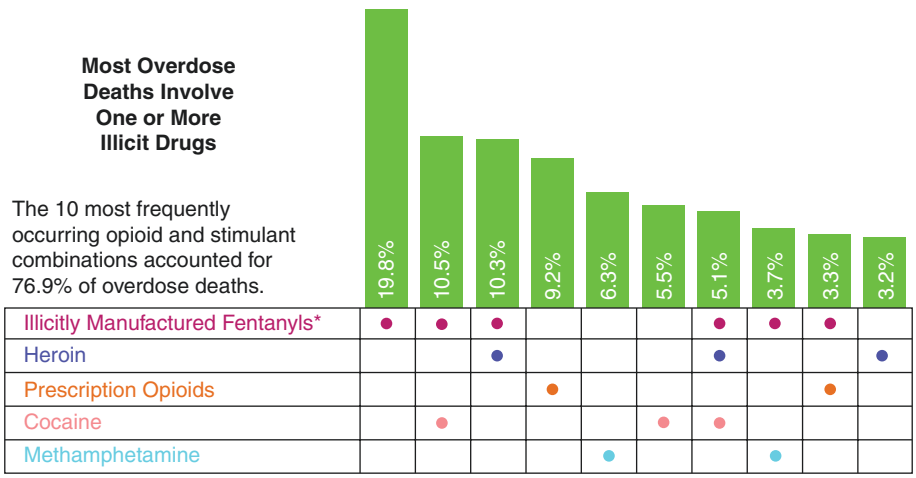


Fig. 1.24 Percentage of overdose deaths involving opioid and stimulant combinations (Data from CDC [37])

Fig. 1.25 Alcoholics Anonymous Group

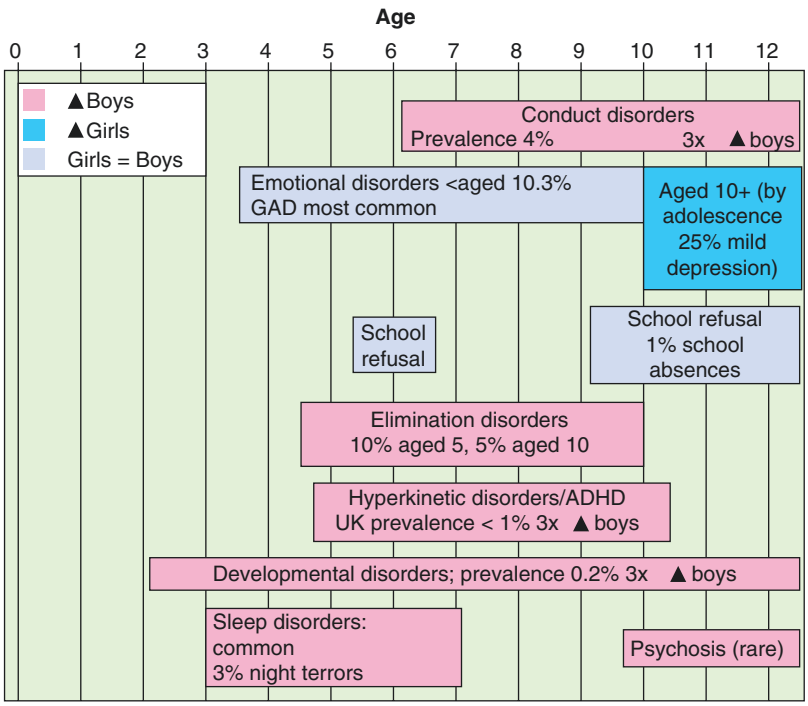


Fig. 1.26 Prevalence of mental disorders in children varies by age

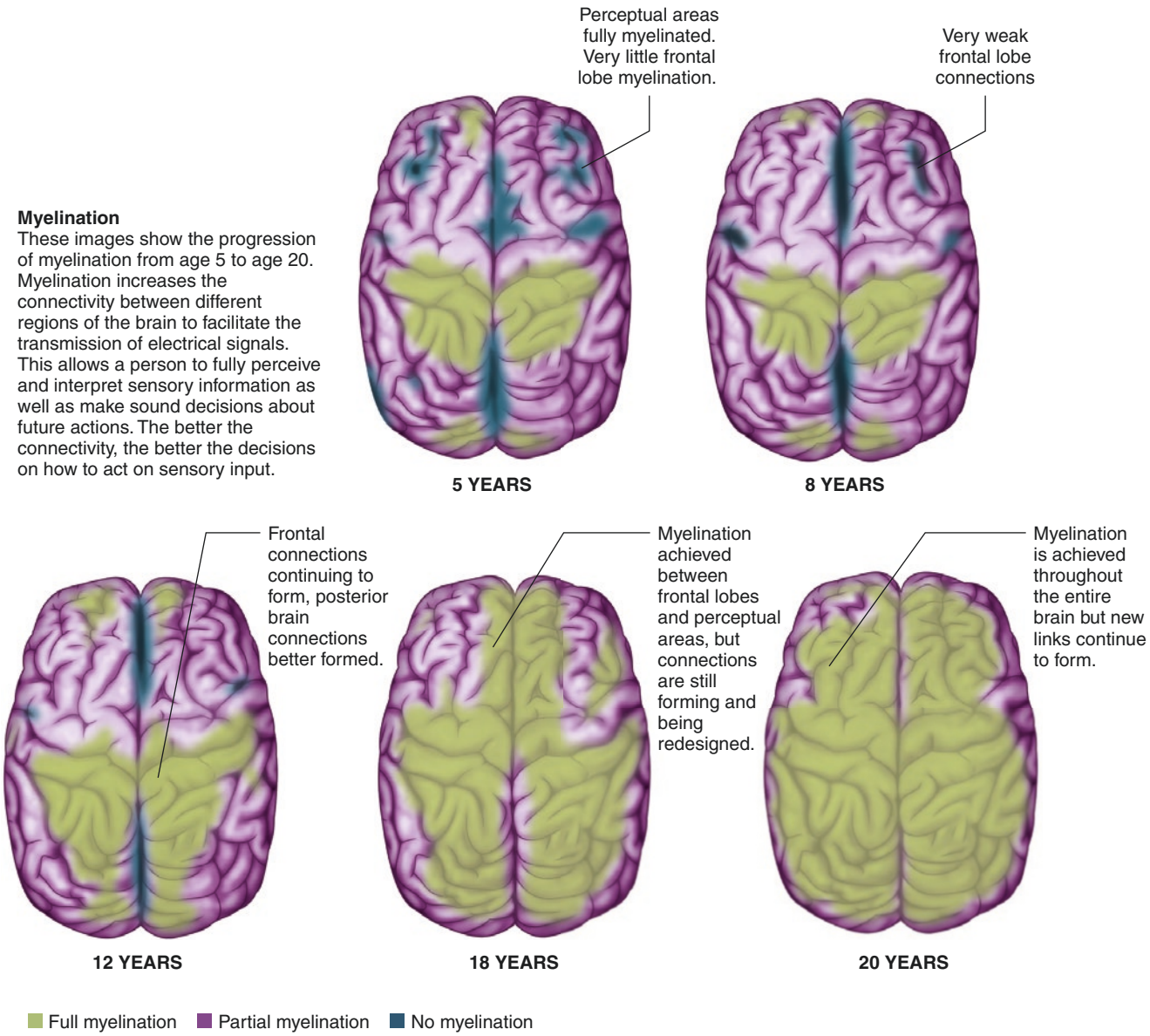


Fig. 1.27 Myelination process from childhood to adulthood

Consultation-Liaison Psychiatry

Physical illness often affects the emotional state of a patient. A patient hospitalized for burn wounds with severe pain may become depressed, resulting in weight loss, anhedonia, feelings of hopelessness, decreased motivation, and even suicidal thoughts. Depression and other mental illnesses in hospitalized patients can result in increased morbidity and mortality as well as prolonged hospital stays. Consult-liaison psychiatrists specialize in diagnosing and treating patients who are being cared for on medical or surgical services in the hospital. Consult-liaison psychiatrists may also work closely with services where psychiatric morbidity is the highest and has the greatest effect on treating patient's medical condition as oncology, pain, pediatrics, or geriatric services [38]. Figure 1.29 shows how stress can lead to mental or physical illness. There are few illnesses that only affect the body and not the mind, and vice versa. Many patients referred to the consult-liaison service have medical comorbidities in conjunction with psychiatric illness or behavioral disturbances. Psychiatrists in this field work diligently to determine which symptoms are due to an underlying medical condition and which symptoms are primarily psychiatric in nature.

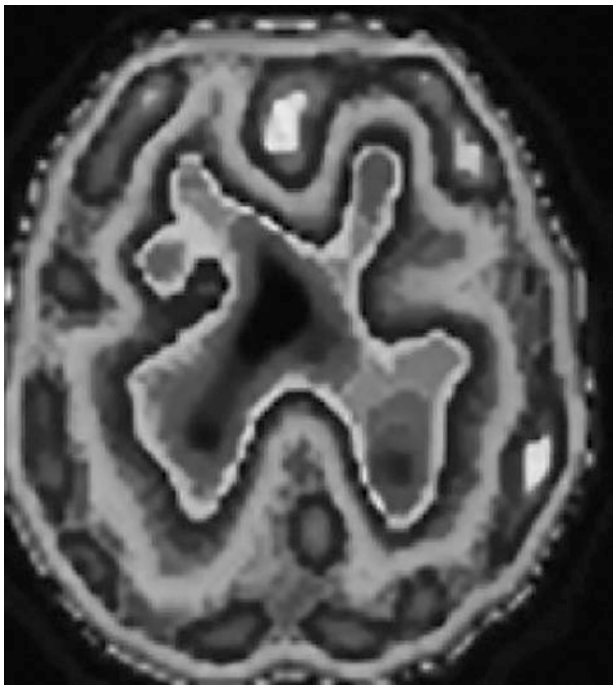


Fig. 1.28 SPECT scan of a 7-year-old boy experiencing paranoia and hallucinations (*Reprinted from* Taylor [36]; *with permission*)

Consult-liaison training provides expertise in the management of delirium and agitation, assessment of capacity to make medical decisions, and conflict resolution between the patient and the primary medical team. Capacity is an important topic to be familiar with and means that a patient can understand their illness, what is recommended for treatment of the illness, and the consequences of accepting or rejecting the treatment. Figure 1.30 describes the key features of capacity.

Forensic Psychiatry

Forensic psychiatry works at the intersection of psychiatry and the law. Forensic psychiatrists perform evaluations for criminal and civil matters. Forensic psychiatrists are experts at analyzing the complex questions of causation and accountability around mental illness and criminal behavior. Forensic psychiatry fellows learn to evaluate referred inmates and civilians. Some of their work includes writing a professional opinion concerning an inmate's consideration for a "Not Guilty By Reason of Insanity (NGRI)" plea. When an individual is unable to work with an attorney for behavioral or

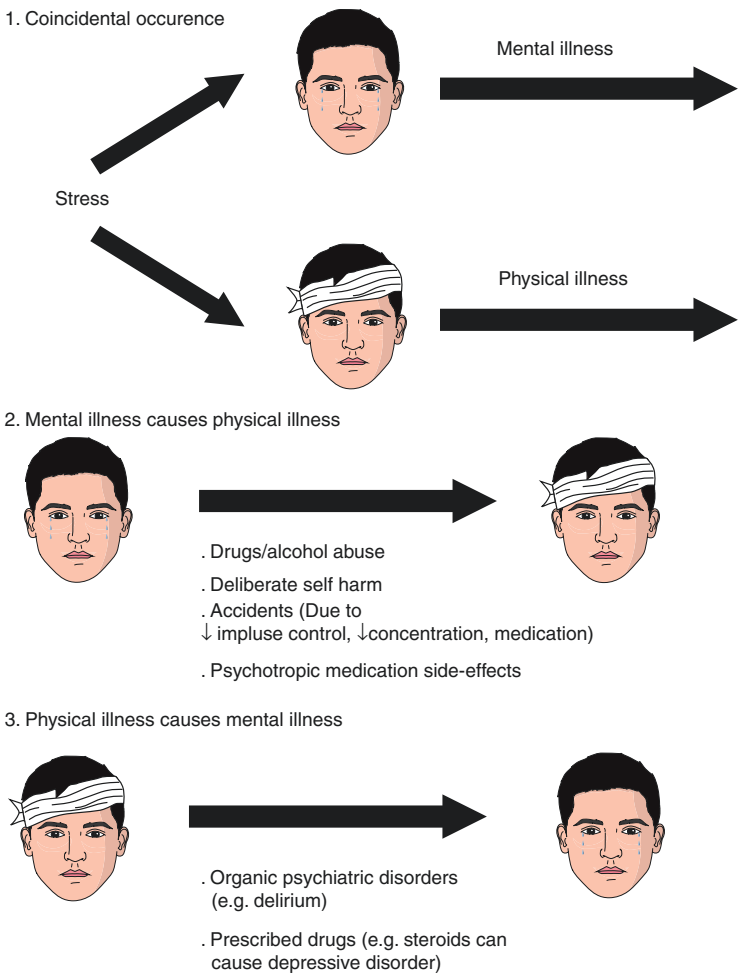
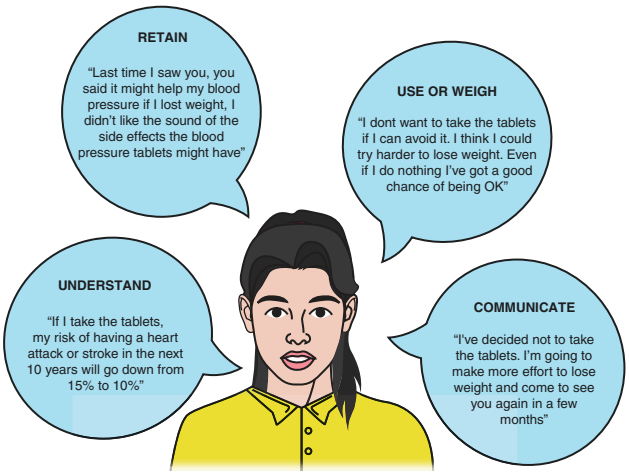


Fig. 1.29 Relationship between stress, mental illness, and physical illness



DO	PRINCIPLE	DON'T
Formally assess capacity	ASSUME PEOPLE HAVE CAPACITY UNLESS PROVED OTHERWISE	Assume someone lacks capacity on the basis of factors such as their age or diagnosis
Take the time to help people understand and make decisions. If they may regain capacity and it is possible to wait, then do so	HELP PEOPLE MAKE THEIR OWN DECISIONS	View capacity as a static phenomenon–it will change over time and will be affected by the way in which you communicate information
Base your assessment of capacity on how the person arrives at their decision, not on what they decide	PEOPLE HAVE THE RIGHT TO MAKE WHAT YOU THINK ARE UNWISE DECISIONS	Conclude that someone doesn't have capacity because you disagree with their decision
Use whatever means available to decide what the person would have wanted for themselves if they had capacity	WHEN SOMEONE LACKS CAPACITY, ACT IN THEIR BEST INTERESTS	Assume you know what is best for other people
Think about the least intrusive and restrictive means of achieving what is in the person's best interests	WHEN SOMEONE LACKS CAPACITY DO NOT RESTRICT THEIR LIBERTY MORE THAN IS NECESSARY	Do more than is necessary

Fig. 1.30 Elements of mental capacity

Fig. 1.31 Jail cell

developmental reasons, a forensic psychiatrist will evaluate for competency to stand trial. If a person is deemed incompetent to stand trial because of mental illness, they receive treatment and are periodically reevaluated by a forensic psychiatrist until competency is achieved. On the civil side, some of the things forensic psychiatrists do include disability, return to work, and testamentary capacity evaluations (Fig. 1.31).

Geriatric Psychiatry

It is estimated that about 20% of individuals age 55 and older have a mental health condition, including depression, bipolar disorder, anxiety disorders, or severe cognitive impairment [39]. Depression is not a normal part of aging and can increase the risk of suicide. When treating depression in geriatric patients, it is important to reduce sensory isolation, help with isolation and provide geriatric doses for medications. Figure 1.32 summarizes the management of depression in geriatric adults.

Men age 85 and older have a suicide rate of 45.23 per 100,000, approximately four times as high as the general population [39]. Geriatric psychiatry fellows are trained in the diagnosis and treatment of psychiatric and neurocognitive disorders of the elder. A strong emphasis is placed on learning to help families, patients, and caregivers manage mental illness and neurocognitive impairment in the aging population. Brain changes are normal as a person progresses in age; however, some changes, such as Parkinson's and other dementias, produce pathological changes. The following figures compare a typical adult brain to a normal geriatric brain and finally, compare all three to that of a person with Parkinson's disease (Figs. 1.33 and 1.34).

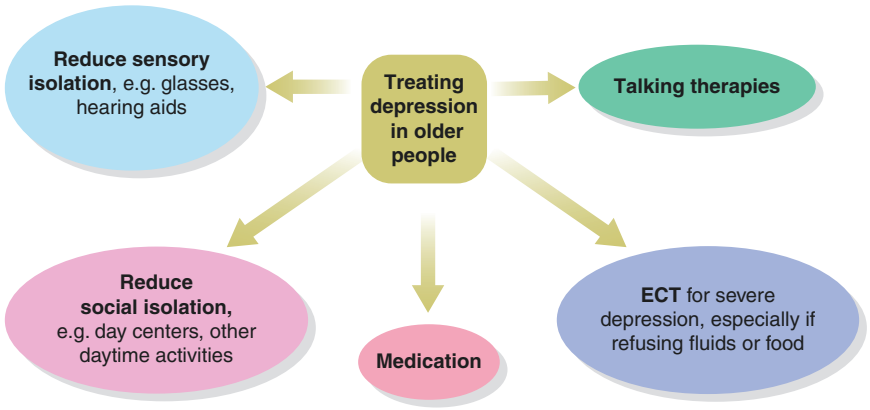


Fig. 1.32 Treating depression in older people

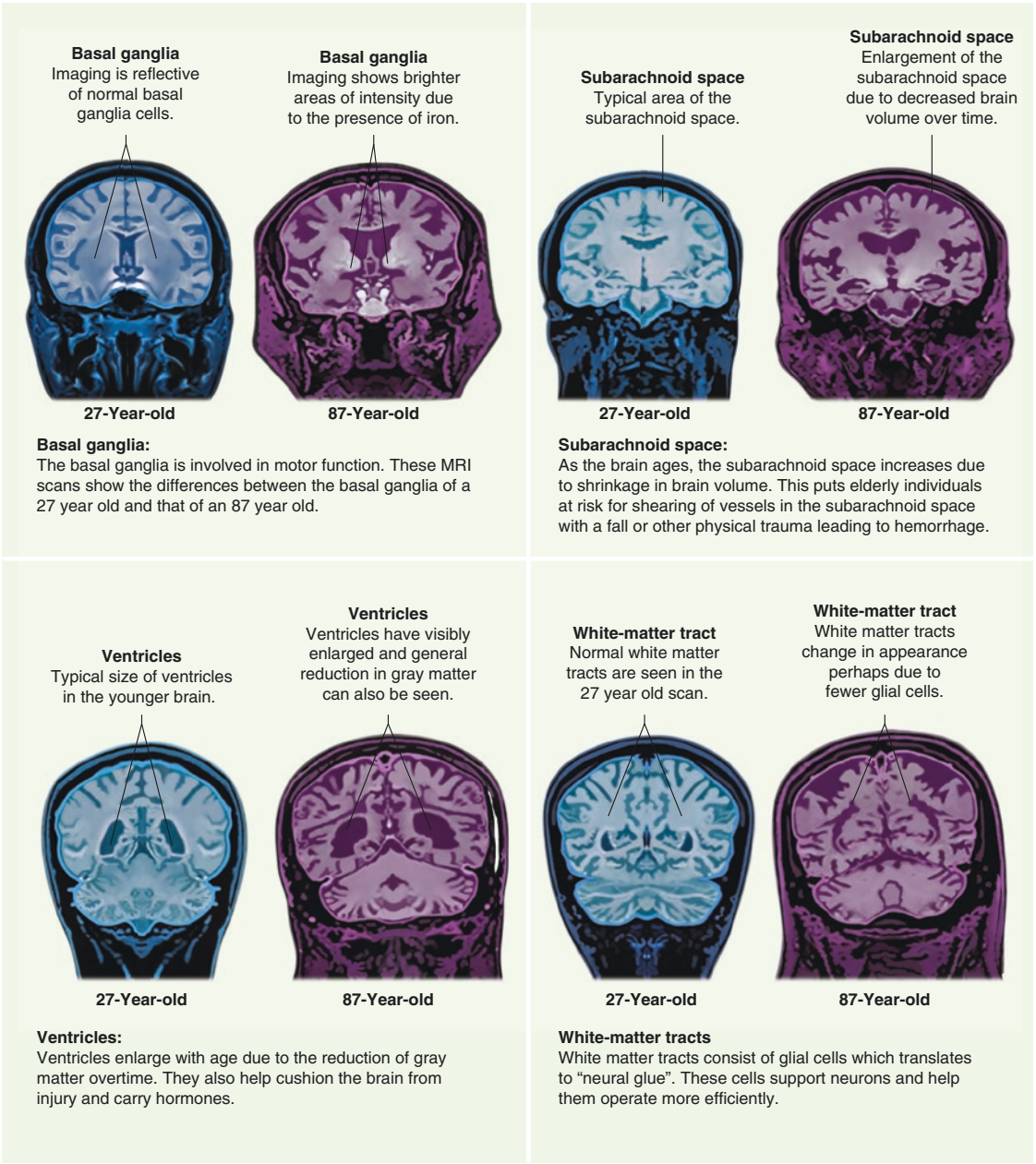


Fig. 1.33 Changes in brain structures with age

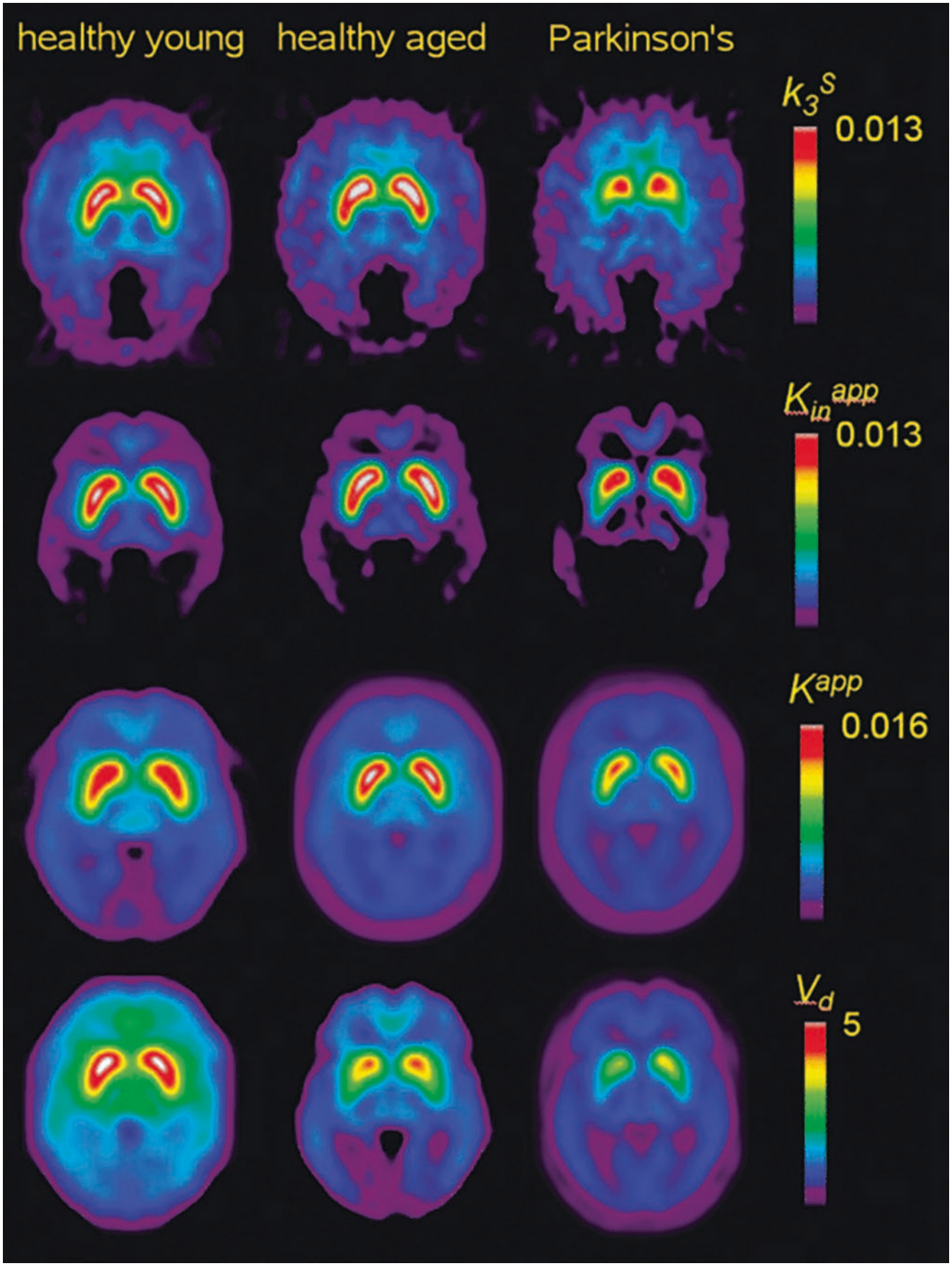


Fig. 1.34 Mean parametric maps of functional dopamine utilization differences between healthy young, healthy aged, and Parkinson's brain [40]

Future of Psychiatry

In addition to providing medication, psychiatrists also provide hope, guidance, and encouragement to patients. To enjoy a career in psychiatry, it helps to be empathic and enjoy talking to patients about their struggles. Overall, psychiatry is a very rewarding field where the treatment of one patient can provide direct relief to them, have a positive impact on their families and communities, and benefit generations to come (Fig. 1.35). For more about the future of psychiatry, see Chap. 25.

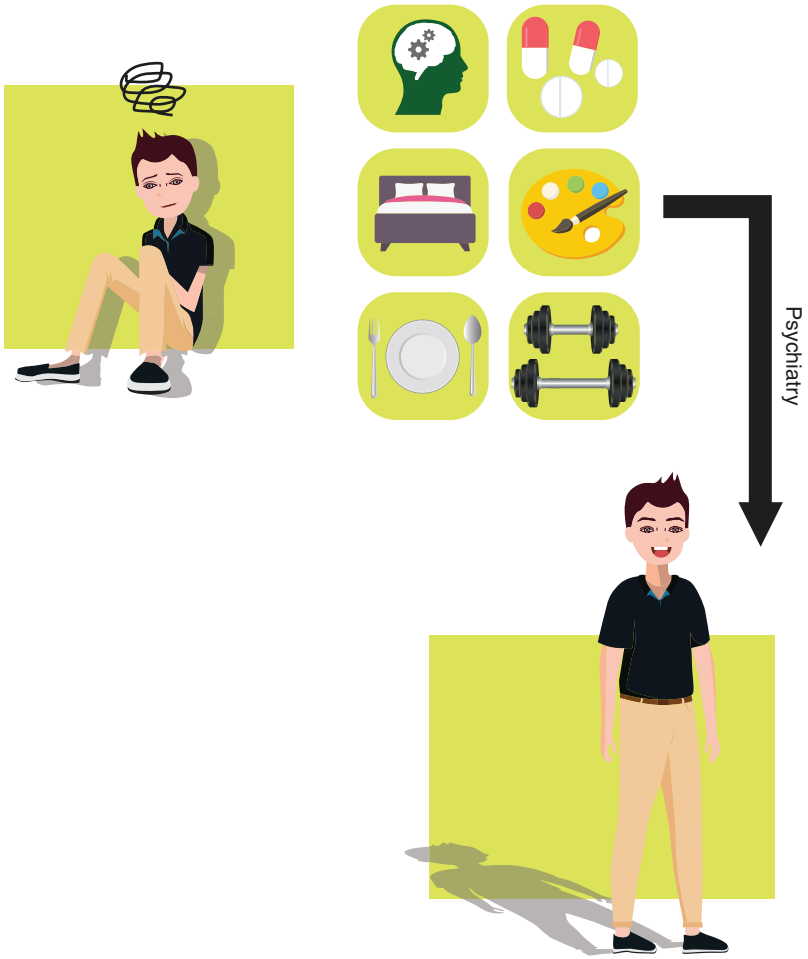


Fig. 1.35 Psychiatry as a tool to improve lives

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