

**Essential idea:** Communication between neurons can be altered through the manipulation of the release and reception of chemical messengers.

A.5 Neuropharmacology	
<p><b>Nature of science:</b></p> <p>Assessing risks associated with scientific research—patient advocates will often press for the speeding up of drug approval processes, encouraging more tolerance of risk. (4.5)</p>	
<p><b>Understandings:</b></p> <ul style="list-style-type: none"> <li>Some neurotransmitters excite nerve impulses in postsynaptic neurons and others inhibit them.</li> <li>Nerve impulses are initiated or inhibited in post-synaptic neurons as a result of summation of all excitatory and inhibitory neurotransmitters received from presynaptic neurones.</li> <li>Many different slow-acting neurotransmitters modulate fast synaptic transmission in the brain.</li> <li>Memory and learning involve changes in neurones caused by slow-acting neurotransmitters.</li> <li>Psychoactive drugs affect the brain by either increasing or decreasing postsynaptic transmission.</li> <li>Anesthetics act by interfering with neural transmission between areas of sensory perception and the CNS.</li> <li>Stimulant drugs mimic the stimulation provided by the sympathetic nervous system.</li> <li>Addiction can be affected by genetic predisposition, social environment and dopamine secretion.</li> </ul> <p><b>Applications and skills:</b></p> <ul style="list-style-type: none"> <li>Application: Effects on the nervous system of two stimulants and two sedatives.</li> <li>Application: The effect of anesthetics on awareness.</li> </ul>	<p><b>International-mindedness:</b></p> <ul style="list-style-type: none"> <li>Attitudes to drugs and the use of drugs differ globally. There are many cultures that use drugs to enhance rituals or religious experiences.</li> </ul> <p><b>Utilization:</b></p> <ul style="list-style-type: none"> <li>Many psychoactive drugs have been used therapeutically to treat a range of mental illnesses and psychological disorders.</li> </ul> <p>Syllabus and cross-curricular links:</p> <p>Chemistry</p> <p>Option D Medicinal chemistry</p> <p>Topic D1 Pharmaceutical products and drug action</p> <p>Topic D3 Opiates</p> <p>Psychology</p> <p>Core: Biological level of analysis</p> <p><b>Aims:</b></p> <ul style="list-style-type: none"> <li><b>Aim 8:</b> The social consequences of psychoactive drugs could be considered, for the user, his or her family and the wider society.</li> </ul>

**A.5 Neuropharmacology**

- Application: Endorphins can act as painkillers.
- Skill: Evaluation of data showing the impact of MDMA (ecstasy) on serotonin and dopamine metabolism in the brain.

**Guidance:**

- Examples of stimulants are nicotine, cocaine or amphetamines.
- Examples of sedatives are benzodiazepines, alcohol or tetrahydrocannabinol (THC).