

Adolescence

Adolescence (from Latin *adolescere*, meaning 'to grow up') is a transitional stage of physical and psychological development that generally occurs during the period from puberty to legal adulthood (age of majority).

Adolescence is usually associated with the teenage years, but its physical, psychological, or cultural expressions may begin earlier and end later. For example, puberty typically begins during preadolescence, particularly in females.

Physical growth (particularly in males), and cognitive development can extend into the early twenties. Thus age provides only a rough marker of adolescence, and scholars have found it difficult to agree upon a precise definition of adolescence.

Adolescence is a **period** of increased **exploration** and novelty-seeking, which includes new social **behaviors**, as well as **drug** experimentation, often spurred on by peer pressure. This is unfortunate, as the immature state of the adolescent brain makes it particularly susceptible to the negative developmental impact of drug use. During adolescence, **dopamine** terminals, which have migrated from the **ventral tegmental area**, pause in the nucleus accumbens, before segregating by either forming local connections or growing towards the prefrontal cortex (PFC). This developmentally late and lengthy process renders adolescent dopamine axon pathfinding vulnerable to disruption by substance use. Indeed, exposure to stimulant drugs in adolescent male mice, but not females, triggers dopamine axons to mistarget the nucleus accumbens and to grow ectopically to the PFC. Some evidence suggests that at this novel site, the functional organization of the ectopic dopamine axons mirrors that of the intended target. The structural rewiring dysregulates local synaptic connectivity, leading to poor impulse control ability, deficits of which are a core symptom of substance-use disorders. Avramescu et al. argue that different substances of **abuse** induce **dopamine** mistargeting events with the off-target trajectory prescribed by the type of drug, leading to psychiatric outcomes later in life ¹⁾.

¹⁾

Avramescu RG, Hernandez G, Flores C. Rewiring the future: drugs abused in adolescence may predispose to mental illness in adult life by altering dopamine axon growth. *J Neural Transm* (Vienna). 2023 Dec 1. doi: 10.1007/s00702-023-02722-6. Epub ahead of print. PMID: 38036858.

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