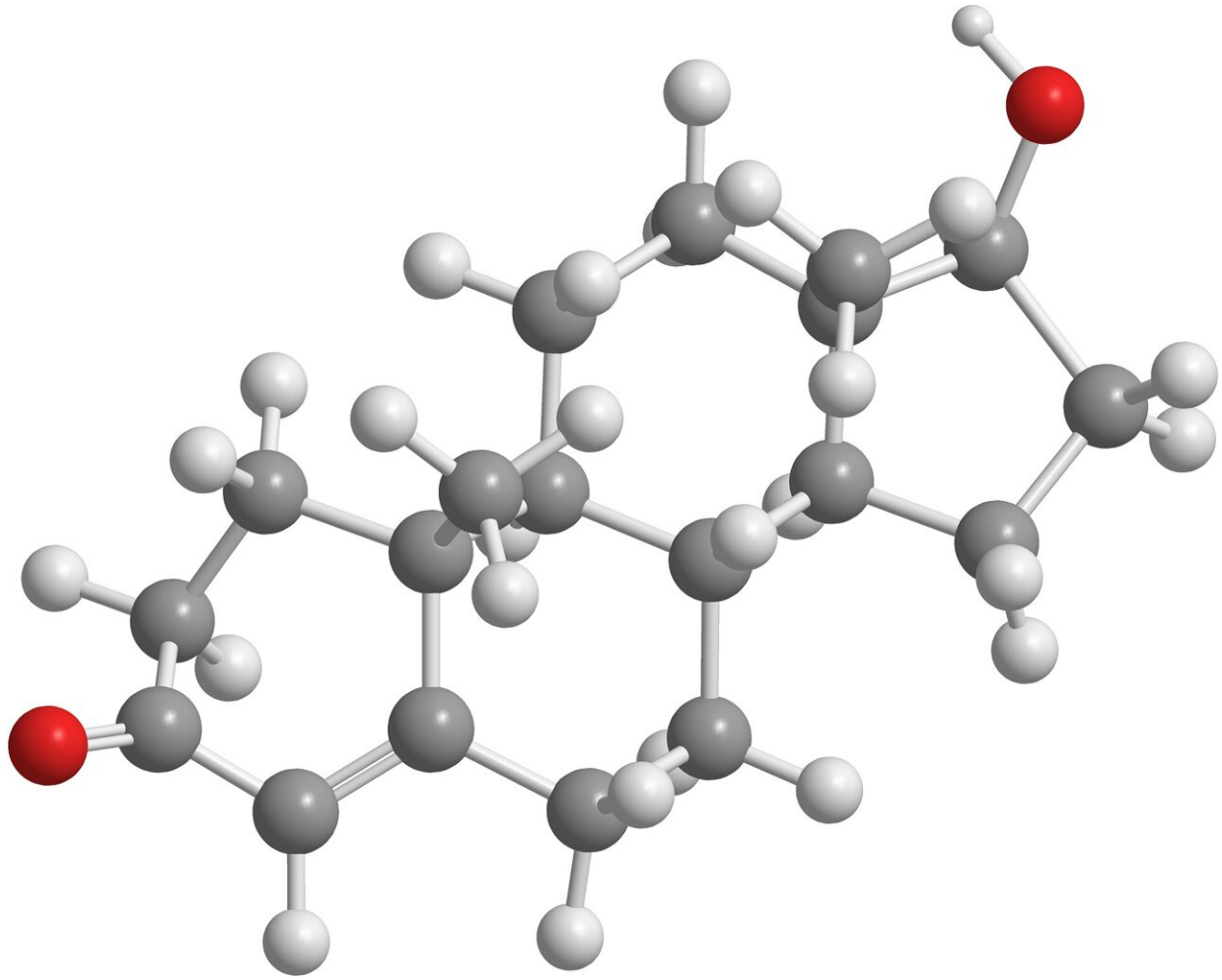
How do testosterone's effects on the brain change from adolescence into adulthood?

June 21 2023



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Higher testosterone levels during adolescence are associated with increased involvement of the brain's anterior prefrontal cortex (aPFC) in emotion control, but the opposite effect occurs during adulthood. In a study published in *Developmental Science*, researchers investigated this switch by conducting brain imaging scans in the same individuals during middle adolescence, late adolescence, and young adulthood.

The study, which included 71 participants, demonstrated that the positive effect of testosterone on aPFC engagement decreases from age 14 to age 17 and then shifts by age 20, when higher testosterone levels are linked with less aPFC activity. In contrast to adolescence, during young adulthood, testosterone—no longer related to pubertal development— may impede emotion control, as implemented by the aPFC.

The findings suggest that the function of testosterone changes within individuals across adolescence and adulthood. The study's investigators note that many mood disorders tend to arise during adolescence, and additional research may reveal whether alterations in the interactions between testosterone and the brain may be related to this.

"Testosterone typically tends to be associated with aggression or dominance behavior, whereas in fact it has multifaceted roles across different developmental periods," said corresponding author Anna Tyborowska, Ph.D., of Radboud University, in The Netherlands. "The findings of the current study are important for understanding both typical and atypical maturational trajectories of the brain, as well as considering the impact of external factors (such as stress) on brain function and development."

More information: Developmental shift in testosterone influence on prefrontal emotion control, *Developmental Science* (2023). DOI: 10.1111/desc.13415

Provided by Wiley