Periodic Graphics

A collaboration between C&EN and Andy Brunning, author of the popular graphics blog *Compound Interest*

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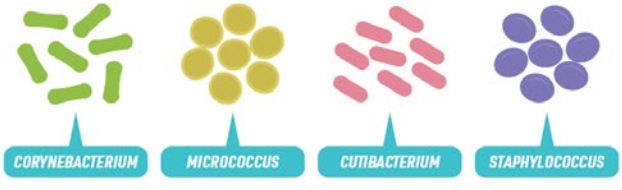
To see more of Brunning's work, go to **compoundchem.com.** To see all of C&EN's Periodic Graphics, visit **cenm.ag/periodicgraphics.**

COMBATING UNDERARM ODOR

What makes our armpits smell when we sweat? And how do deodorants and antiperspirants fight the odor? Here we take a look at the chemistry involved.

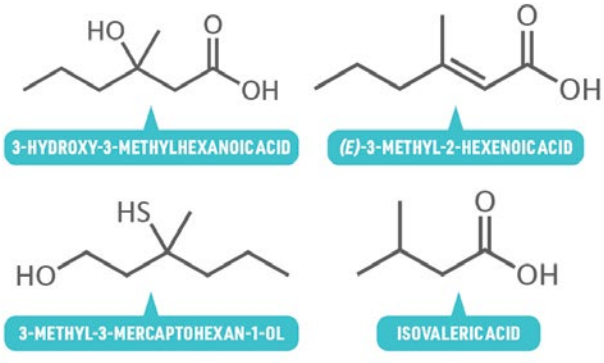
WHAT CAUSES UNDERARM ODOR?

Microbes that live on our skin transform odorless underarm secretions such as amino acids into stinky molecules. Our resident underarm microbes consist mainly of four groups of bacteria, but corynebacteria are the primary cause of underarm odor.



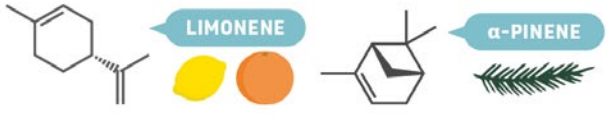
MALODOROUS MOLECULES

Short- and medium-chain volatile fatty acids are the main contributors to underarm odor, along with a small number of thiols.

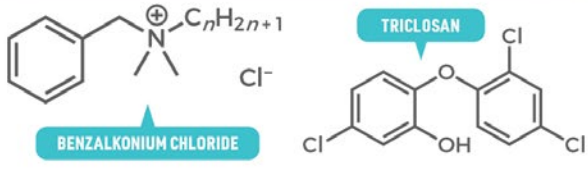


DEODORANTS AND ANTIPERSPIRANTS

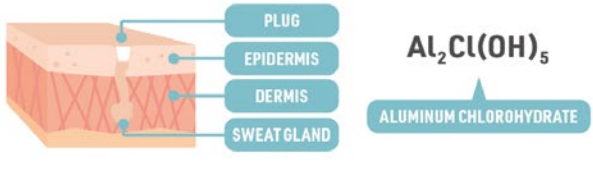
Deodorants and antiperspirants include pleasant-smelling compounds to mask the stinky ones. Some common fragrance molecules include limonene, which has a citrus scent, and pinene, which has a pine smell.



Deodorants and antiperspirants can also include antimicrobial compounds that kill bacteria that produce malodorous molecules. Common antimicrobials are benzalkonium chloride and triclosan.



Antiperspirants rely on aluminum-based compounds that form polymeric plugs to block perspiration from escaping sweat glands. With less perspiration around, underarm bacteria make fewer malodorous molecules.



PERIODIC GRAPHICS