

Editor-in-Chief's Note

A Mentation on Mold

Moldering

My body lives nearby the ocean

My body lives nearby the sea

My body stays damp from the moisture

And now there is mold over me

This month's Update is about the dangers of mold. Given that *Clinical Therapeutics* is a medical journal, it is highly likely that most of our readers will know what mold we are covering. Perhaps some will think we are talking about someone trying to mold our ideas about something by "fake news" or other forms of propaganda or brainwashing. I mention this knowing that this type of molding is increasingly pervasive these days. Also, few readers, if any, will picture a wax or clay mold for copying an object. We are referring solely to fungal mold; multicellular organisms that thrive on moisture and are characterized by fine, filamentous, threadlike extensions called *hyphae* and produce spores that spread easily, especially through the air.

Our Topic Editor for Allergy, Asthma, and Immunology, Dr. Theoharis Theoharides, chose mold as the subject for his collection of Update papers.¹⁻⁶ He is correct that mold is a much-neglected topic, one that is important from both individual and public health perspectives. Currently, there is evidence of climate change all over the world, with some areas experiencing unprecedented rainfall and heatwaves—both classic, predisposing conditions for mold formation. At *Clinical Therapeutics*, we feel that mold and its complications do not receive enough attention in the readily accessible lay and scientific literature. Our hope is that this Update will stimulate submissions about mold research that focus on its prevention, remediation, and medical consequences.

My own awareness of mold stems from about age six. I grew up in Florida in the era before homes were air conditioned. Many days were marked by combinations of heat and dampness, especially in the 1940s and 1950s. During almost every late summer and early fall, flooding occurred due to tropical storms or hurricanes; mold was predictable and inevitable. One result was spots or sheets of black mold on the cement blocks of house foundations. Another was similar blackening on the lowest several feet of walls subjected to flood waters. Because our house was raised off the ground by the height of three cement blocks, my friends and I would often crawl under the house to play even though there was considerable evidence of mold. One regular activity was searching for what we called "doodlebugs." When touched, they instantly curled into little balls. They also made little funnel-like depressions or pits in the sand. Ants would fall into these holes and miraculously disappear. This was a source of endless fascination to us. We would search for their trails in the sand in the darkness under the house, and the hunt would begin. I once took a shoebox, filled it with sand, added in several balled-up doodlebugs, and for a few days, I would watch their performances with pleasure.

Remembering doodlebugs prompted me to look up information about them. They are members of the nerve-winged insect order Neuroptera, its suborder Planipenia, and within that the Myrmeleontidae family, more



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commonly referred to as "antlions."^{7,8} Their six-legged mobile larvae are the doodlebugs. For reasons I could not discover, they can only walk backwards. If any reader knows the answer to this oddity, I and many others will be grateful. Their squiggly, tortuous trails in the sand are the source of their name, doodlebugs.

Another memory of mold relates to oranges. My dad was a citrus farmer. One of my happiest childhood activities was riding with him to inspect the groves. Inevitably, there would be a few overripe or rotting oranges under the trees. These fallen fruits gave off a unique, musky smell. My dad said it came from the oils in the skin that were released by the surface molds. Household citrus-based cleaning products have a muted version of this odor. The mold is bluish-greenish in the center with whitish fringes. Over time it can surround the entire orange. The mold is from *Penicillium digitatum* and *Penicillium italicum*.⁹ We were told never to eat moldy oranges, but I have seen people cut off the molding sides and eat what appeared to be the untouched fruit. Because hyphae can penetrate into deeper and unseen areas, this may not be wise, as even the healthy-looking pulp may contain *mycotoxins*—poisonous, disease-causing, secondary metabolites produced by some fungi. In my limited experience, I have never heard of anyone actually getting sick from mold on oranges. Mold can develop on oranges even when they are stored in cold temperatures because they carry spores on their surface that travel with them from the groves.

My next anecdote is a contemporaneous one. One of my wife's children is a maker of award-winning cheeses. Through him, I have come to appreciate the complexities of molds, moisture and temperature control, and aging in the cheesemaking process. Visiting a cheese cave is a special experience. Only nontoxic molds are chosen to add to the flavor and texture of certain cheeses. Blue cheese, for example, with its finely lined patterns of bluish-grey mold, uses *Penicillium roqueforti* or *Penicillium glaucum* to promote its smooth texture and unique flavors. Camembert-like cheeses use molds only on the surface. They are coated with *Penicillium camemberti* and then allowed to ripen for several weeks to create an edible rind. *Vive le fromage!* Just as with many other foods, unwanted mold can also grow on the surface of cheeses, especially when they are improperly stored. For hard cheeses such as parmesan, molds will not typically penetrate deeply into the cheese. Mold may be cut away, preferably using a wide margin.

Finally, just a few words about "bad" molds: some can be toxic, pathogenic, or allergenic. *Aspergillus*, for example, is a long-chain mold that can trigger asthma and pneumonia; some varieties can produce the carcinogen aflatoxin. An acquaintance unwittingly developed pneumonia and emphysema by inhaling spores that formed under floorboards dampened by a slowly leaking pipe under a sink. I have always remembered *Mucor* from my medical school days. Mucormycosis can present with many different pictures, including asthma; flulike symptoms; or damage to the brain, eyes, ears, nose, sinuses, or lungs. *Mucor* grows around sweating HVAC (heating, ventilation, air conditioning) equipment. *Alternaria* flourishes around showers and tubs or in water-damaged homes. *Acremonium* is often seen in humidifiers or around drains.

Knowing a bit about molds, I was surprised when we moved into a new apartment to learn that what I thought was a pinkish-reddish mold around the water rims in the toilet bowls was not a mold at all. Although commonly referred to as "pink mold," it was actually caused by the bacterium *Serratia marcescens*.¹⁰ Left alone, it too can cause problems, including urinary tract infections. Fortunately, it is readily removable with diluted bleach.

Molds can be good or bad. We need to celebrate and enjoy the good ones and prevent or promptly eliminate the bad ones. Ignoring molds can be costly. Using diluted bleach solutions may be insufficient. I suspect that with climate change we may be training more persons with mold-remediation skills and equipment.

In this month's issue of *Clinical Therapeutics*, we also feature an Update on diabetes mellitus, assembled by Dr. John Ryan, our Topic Editor for Endocrinology, Diabetes, and Other Endocrine Disorders. The included articles, which emanated from the 53rd Annual Meeting of the European Association for the Study of Diabetes, shed light on the complications and comorbidities of type 1 and type 2 diabetes.¹¹⁻¹⁶

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