

# STANDARD DEVIATIONS: The Big Bug Battle

Greetings,

Persist or perish. Every choice, action, and decision of every life form every moment boils down to one or the other.

Recently, [microbes have been found in marine sediment](#) that are over 100 million years old, and still “alive”.

Crushed under incredible pressure and immobilized these microbes still show evidence of metabolism after millions of years. Like a Timex watch, they “take a lickin’ and keep on tickin’.”

But this is just another one of the ways that bugs hang on.

The latest outbreak of Ebola in Guinea has been linked genetically to latent virus from a survivor. The virus found a hiding place secluded from detection within the body of its host and waited years for an opportunity to reemerge.

HIV, syphilis, and other organisms also survive by hiding in plain sight.

The ways that life finds a way to cheat death are numerous and varied.

Of course, a lot of us just die off. But not everyone.

Some of us hunker down and wait for times to get better. Some of us change to adapt. Some of us borrow from, steal from, or join up with others to make it through. Mitochondria are a good example of how far we’ll go just to keep going.

Tardigrades and rotifers demonstrate how well desiccation works. Spore-forming bacteria are another example of successfully surviving dehydration, radiation, and myriad lethal conditions. The amebic cyst is another great survivor.

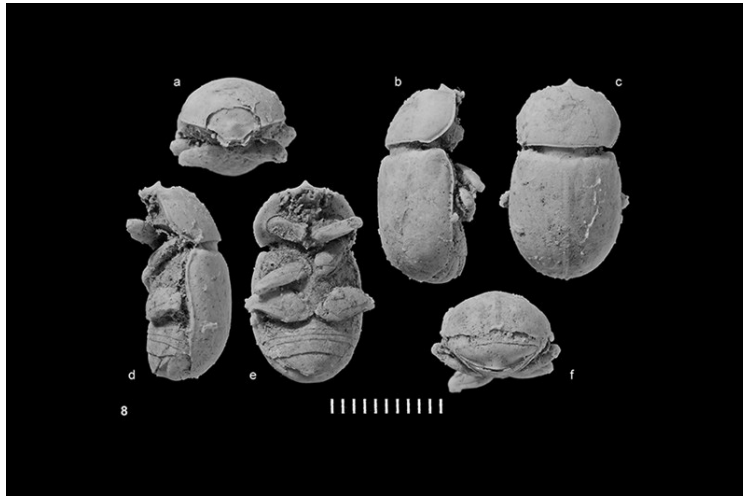
Our own makeup is nearly 8% viral DNA. Everything an organism “is” is meant to increase the chance of survival.

The things we do to kill bugs are extreme. Our chemical threats with bleach, alcohols, and quaternary ammonium compounds are extreme and dangerous to ourselves. Sterilization is a clumsy and costly, labor-intensive process. Antimicrobials and insecticides are other lines of defense with their own drawbacks.

On the bench we battle these bugs each and every day. Disinfection and decontamination are part of our routine and keeping bugs at bay is our goal. But, like Sisyphus, it’s a rock we roll uphill every day only to find it at the bottom every morning. We fight the same battles over and over, but it’s a war we can never win.



June bugs have been around for a while. Scarab and stag beetles appeared in the fossil record as early as the Jurassic Period and evolved into one of the largest beetle super-families with over 35,000 extant species.



{Coleoptera fossil from Pliocene era, 3.5 million years ago.}

There are still beetles crawling, squirming, and flying around, but not as many. Insects are in decline in many parts of the planet. Pollinator biomass is falling sharply, Monarch butterflies are drastically reduced in California and their future is far from certain.

But bugs will survive. Guaranteed. They will be here long after humanity has found a way to go extinct. The same is true for the pathogens we kill every day on our bench top. Tomorrow the threat will be back.

In the vast number of cases we have no worries about who survives and how; but with pathogens it's us or them. One battle lost could be one too many.

The decisions we make about biosafety on the bench are the choices we make to either persist or perish. Or decontamination protocols and pathogen awareness are critical to keeping bugs in their place and us in ours.

Have a great week and be safe,

Bryan

p.s. Some of our ancient viruses may be protecting us from disease; others may be raising our risks for cancer, among other conditions. It's not an either-or — are these things good or bad? It's a lot more complicated than that.

Most of our viral DNA comes from one group in particular: retroviruses, a group that includes HIV. At first, endogenous retroviruses coax cells to make more retroviruses that can infect other cells. But over the generations, the viral DNA mutates, and endogenous retroviruses eventually



lose the ability to infect new cells. If that information confers some advantage then we hold on to it; and in a way, the virus and the host both benefit.

