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The Death Microbiome: Invasion of the Body Snatchers

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Our bodies contain trillions of symbiotic microorganisms that aid us in everyday life, from digestive functions to immune system benefits. So what happens to them when we die? As it turns out, they turn on us. Learn more...

In the first-ever genetic sampling of organs from human cadavers, researchers at Alabama State University have found that trillions of microbial cells from our gut flora stage a mass invasion of our body's internal organs once we die—creating what is called the thanatomicrobiome, or "death microbiome."

"We know that microbes have co-evolved with us in life, but the question was have they co-evolved with us in death?" said Peter A Noble, Professor of Microbiology at Alabama State University, who led the study published in the *Journal of Microbiological Methods*.

Noble said our gut's microbes animate during an organ feeding frenzy that begins as our heart stops pumping oxygen and our immune system ceases to keep them in check. While this sounds like a plot twist from "*The Walking Dead*," Noble believes these microorganisms could have co-evolved with us to decompose our organs before passing on to a new host.

"Without oxygen, our cells release all these nutrients, and these bacteria throw a party because this allows them to grow and reproduce," explained Noble. "It's incredible because we probably acquired them in our adult life, and they have coevolved to wait until our death to digest us."

Noble's team studied the types of bacteria found in the heart, liver, spleen, and brain of 11 cadavers, between 20 and 240 hours after death. Using a phenol/chloroform DNA extraction method, Noble's team was able to cleanly amplify gut microbes from DNA samples, finding that more oxygen-reliant bacteria strains such as *Escherichia coli* colonized organ tissues 20 hours after death. Meanwhile, in older cadavers the dominant strains were those that do not need oxygen to survive, such as *Clostridium*.

"We thought that because different organs have different biochemical properties, certain microbes would only thrive in certain organs, but each microbial community thrived everywhere," said Noble. Surprisingly, the identity of the bacteria proliferating in organ tissues proved dependent on the time since death rather than each organ's chemical makeup, which Noble thinks could have implications in forensics and medicine. "This is a whole new field, and it definitely needs to be researched more in-depth."

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Reference

Can I, Javan GT, Pozhitkov AE, Noble PA. Distinctive thanatomicrobiome signatures found in the blood and internal organs of humans. J Microbiol Methods. 2014 Aug 1;106C:1-7.

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