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### A painting as habitat: art as food to eat and protect, by microbes

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If you could zoom in for a microscopic look at an oil painting on canvas, you would see many thin, overlapping layers of pigments—powdered bits of insects, plants, or minerals—held together with oils or glue made from animal collagens. Many of those pigments and binding materials are surprisingly edible to bacteria and fungi. Each patch of color and each layer of paint and varnish in an oil painting offers a different microbial habitat. So when you look at a painting, you're not just looking at a work of art; you're looking at a whole ecosystem. What's eating this 400-year-old painting? A whole ecosystem of microbes (Kiona N. Smith for Ars Technica, on a study of the microbes on a Renaissance painting called "Incoronazione della Virgine," by painter Carlo Bononi)

**Germs of Genius—a Masterpiece's "Microbiome" Can Spell Its Demise** -- *But microbes living on canvases may also help preserve irreplaceable works of art* (Richard Conniff for Scientific American)

People have worried about the effects of fungi and other microorganisms on cultural objects

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#### microbial damage.

#### Bacteria could protect old paintings from pigment-eating microbes (Sam Wong for New Scientist)

Pigment-eating microbes play a part in degrading priceless paintings, but other microbes may help us to save them.

Just like our bodies, oil paintings are home to a community of microorganisms, but few

studies have attempted to describe them. To learn more about the microbes that live on paintings, Elisabetta Caselli of the University of Ferrara, Italy, and colleagues sampled tiny sections of *Incoronazione della Virgine*, a work completed in 1620 by the Italian painter Carlo Bononi. The canvas was hung on the ceiling of the Basilica of Santa Maria in Vado in Ferrara until an earthquake damaged the church in 2012.

The researchers isolated multiple strains of *Staphylococcus* and *Bacillus* bacteria that were living on the painting, as well as thread-like fungi from four genera, including *Aspergillus*, *Penicillium*, *Cladosporium*, and *Alternaria*. They also identified pigments such as red and yellow earths and red lac that could be nutrient sources for the microorganisms.

**Characterization of biodegradation in a 17th century easel painting and potential for a biological approach** (Elisabetta Caselli , Simonetta Pancaldi, Costanza Baldisserotto, Ferruccio Petrucci, Anna Impallaria, Lisa Volpe, Maria D'Accolti, Irene Soffritti, Maddalena Coccagna, Giovanni Sassu, Fabio Bevilacqua, Antonella Volta, Matteo Bisi, Luca Lanzoni, Sante Mazzacane) Published: December 5, 2018 https://doi.org/10.1371/journal.pone.0207630

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surface of six-hundred-year-old cooking pots found at an inuit site in northern Alaska. Three years later, chemists found a hundred and twenty-six different proteins in a mammoth femur. With new proteomic techniques emerging constantly, the field has a heady, chaotic atmosphere of possibility. At a four-day conference called Ancient Proteins, held this summer in Copenhagen, presentations had titles such as "**Biologics in Art: Whaaat???**," "Palaeoproteomic Analysis of Binding Media and Adhesives in Ancient Egypt," and "Through the Looking Glass, and What Amino Acids Found There."

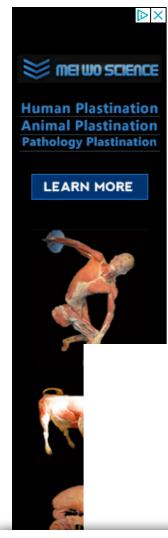
Emphasis mine, because awesome. And science!

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