

# SPORE PRINTS

BULLETIN OF THE PUGET SOUND MYCOLOGICAL SOCIETY  
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## TWO NEW U.S. TRUFFLE SPECIES DISCOVERED

Dan Basso

<https://www.freep.com/>, Jan. 16, 2025

Michigan State University and University of Florida researchers have discovered and named two new truffle species native to the U.S., which could eventually lead to a variety of new uses for the tasty, aromatic fungi that grow underground.

The species were named for how and where they were found, MSU said in a press release on Thursday.

The first new truffle, *Tuber canirevelatum*, meaning the “dog-found” truffle, was named in honor of the truffle dog Monza, which found the fungus with her trainer, Lois Martin. *Tuber cumberlandense* was named for the Cumberland Plateau in Tennessee where it was found by Margaret Townsend and her truffle dog, Luca.

“Receiving these samples was very exciting, especially because they looked very similar to the well-known edible European truffles *Tuber macrosporum* and *Tuber aestivum*,” said Alassane Sow, an MSU undergraduate research assistant, who worked on the project. “We hope that by describing both of these species there will be increased interest in cultivating North American truffles. Our analyses show that each has aromatic compounds found in some of the most valuable truffle species.”

*Tuber canirevelatum* did not look or smell like anything known to grow in North America, MSU said in the release. Martin mailed a specimen to the lab of Gregory Bonito, associate professor in the Department of Plant, Soil and Microbial Sciences at the MSU College of Agriculture and Natural Resources, where he and Sow used DNA analyses to identify the two truffles.

Although *T. cumberlandense* has been harvested in truffle orchards and in woodlands and has been sold under various names, the analysis showed that it is a distinct and previously undescribed species native to North America, Bonito said.

“Truffles are some of the most mysterious and alluring fungi on the planet,” said Benjamin Lemmond, a member of the Smith Lab, Department of Plant Pathology, University of Florida, said. “They live their lives underground, out of sight, but people all around the world are eager to find them and enjoy their unique culinary qualities. This study shows that there are still undiscovered truffles right under our nose, so to speak, and that without

the help of dogs (and their incredible noses) we might never find them.”

Bonito, along with Matthew Smith from the Department of Plant Pathology at the University of Florida, has been surveying and identifying native North American truffles since before 2010. Bonito and Smith received NSF-funding in 2020 to research the evolution of truffles, morels, and their relatives known as pezizales.

### What are Truffles?

Truffles belong to the genus *Tuber* within the family Tuberaceae. They are characterized by hypogean (underground) growth, developing as the fruiting bodies of the fungus. Unlike typical mushrooms, truffles grow beneath the soil surface, usually at depths ranging from a few inches up to about 3 feet, depending on the species and soil conditions.

### What is the Most Expensive Truffle?

Truffles don’t last long, so they aren’t long-term investments. That hasn’t stopped people from spending lavish amounts of money on the fungi. Among the top prices paid was \$330,000 for a 2.86-pound truffle in Croatia auctioned off in 1999, *Money Inc.* reported.

### Why are Truffles So Rare?

Truffles are elusive for a few key reasons, according to the website [truff.com](http://truff.com):

1. **Limited Habitat:** Truffles grow in highly specific environments. They are most commonly found in select regions of Italy, France, and Spain, though they can also be cultivated in parts of North America and Australia.
2. **Environmental Fragility:** Truffles require very precise conditions to flourish. Climate change, deforestation, and human activity can disrupt the delicate balance they need, reducing the likelihood of finding harvestable truffles in the wild.
3. **Difficulty of Cultivation:** Unlike most agricultural products, truffles can’t be easily mass produced. While truffle farming is possible, it takes years to establish a productive truffle orchard.
4. **Manual Harvesting:** Since truffles grow underground, they cannot be harvested by traditional farming methods. Truffle hunters must rely on trained animals—usually dogs—to locate them.
5. **Short Growing Season:** Truffles only grow during specific times of the year, further limiting their supply.

*cont. on page 3*



*Tuber cumberlandense.*



*Tuber canirevelatum.*

INaturalist

Sow, L. Martin & Lemmond

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means some tasks and duties will be shifting in the coming weeks. Among them, the board is looking for a volunteer (or two) willing to be our **Zoom host(s)** at the monthly membership meetings (2nd Tuesday of the month, 7:30–9:00 pm). Training and equipment will be provided by PSMS. Would you be interested? Please contact PSMS volunteer coordinator Peg Rutchik at [volunteer@psms.org](mailto:volunteer@psms.org).

Next, the **Strategic Planning Committee** brought back to the board their updated review of the 2018 Strategic Plan and its 2020 follow-up. The tasks identified in the past were categorized and assessed up to date, identifying those that have already been completed and those that are in progress or have not been initiated yet. This elicited very interesting discussions, which will continue over the next few months as the committee's work moves forward. Other committee chairs will be providing input as to their own fields of action, and ideas on potential improvements to or optimization or scaling-up of their activities. We are very appreciative of the heavy-lifting work the committee is doing. Thank you all!

As we never tire to mention, PSMS is an organization **100% operated by volunteers**. Everybody, from the guides that take new members out on a field trip, to our treasurer who deals with all things financial, to our Outreach Committee that give talks at schools and libraries, to the editor who makes this issue of *Spore Prints* possible, everybody is a volunteer generously offering their time and expertise. Some of our members are now volunteering to represent the interests of PSMS as officers and trustees of the board. **You can do your part by casting your vote!** Remember, the deadline is March 9th.

And after doing that, take a peek at the “**Engagement**” page on our website to find out about all the volunteering options available. Your skills may be exactly what we are needing!

**Happy elections**, and see you again in March!

## CALENDAR

- Feb. 11 Membership meeting, 7:30 pm, CUH and virtual via Zoom
- Feb. 17 Board meeting, 7:30 pm, CUH board room and virtual via Zoom
- Feb. 18 *Spore Prints* deadline
- Mar. 9 Election deadline

## BOARD NEWS

**Carolina Kohler**

The board's first meeting of 2025 was held on Monday, January 20, via Zoom, as has been the norm for the past couple of years. After the customary approval of the previous meeting minutes and the treasurer's report (you can always check these in the “**File Archive**” section of the PSMS website), the group went straight to work.

As you are all likely aware by now, our elections are on! From February 1 – March 9, PSMS members will be voting on a President, Secretary, and five Trustees for the 2025–2027 term. This

## MEMBERSHIP MEETING

**Joseph Zaposky**

The warning signs are all around us, the lights are blinking RED. Climate change is real and it will adversely impact our lives in the coming years. The most recent fires in Southern California are just a taste of what's to come.

Our next speaker, Ron Hamill, has spent the last 30 years studying, cataloging, and making observations concerning such environmental responses to climate change. Our canary in the coal mine, Ron spends most days inventorying things that most persons never see—fungi, lichens, and bryophytes (mosses and liverworts). Having this perspective, observing these changes year to year, Ron gives us a unique view of what lies ahead for us.



*Ron Hamill  
in the field.*

As a field mycologist/botanist, expert identifier, founding member of The Cascade Mycological Society, and member of the Pacific Northwest Key Council, Ron brings a deep and extensive knowledge and understanding to bear. His studies and journals cover California, the Pacific Northwest, Canada, and Alaska.

Please join us Tuesday evening, February 11th, at the Center for Urban Horticulture, University of Washington, to hear what Ron has to say.

This meeting will be a “hybrid” meeting both in-person at the Center for Urban Horticulture and virtual on Zoom. Doors open at 7:00 pm. The lecture will start around 7:30 pm.

## Two New U.S. Truffles, *cont. from page 1*

### Why do They Use Dogs To Find Truffles?

Dogs have a much more sensitive sense of smell than humans and can be trained to detect truffles underground, according to the American Kennel Club.

### What are Researchers Discovering about the New Truffles?

Bonito said that each species of truffle produces a unique aroma, which is the basis for the culinary potential of truffles and, therefore, their value.

Bonito and Sow worked with MSU’s Randy Beaudry, professor in the MSU Department of Horticulture, using gas chromatography to qualify and characterize the volatiles, chemical compounds that create a truffle’s aroma. “We found that *T. canirevelatum* was enriched in compounds such as dimethyl sulfide and methyl 1-propenyl sulfide, which contribute to the truffle’s savory garlic aroma,” Sow said. “In *T. cumberlandense*, we found the compounds dimethyl sulfide (found in the Périgord black truffle and the Piedmont white truffle) and 2,4-dithiapentane (commonly used when making synthetic truffle products).” “Our research reinforces the importance of using trained truffle dogs in tuber research and truffle farming,” Bonito added. “We suspect many native tuber species remain to be discovered and described. This task will be enhanced through the continued collaboration between mycologists—scientists who study fungi—the public, and trained truffle dogs.”



## RATS IN POLICE EVIDENCE LOCKERS ARE GETTING HIGH ON SEIZED DRUGS—AND PUTTING CASES IN JEOPARDY

Anthony Blair  
<https://nypost.com/>, Jan. 16, 2025

These rats are breaking *into* police precincts—to get high on drugs. Drugged-up Texas rodents have reportedly been gobbling up marijuana and magic mushrooms stored as evidence in police precincts, potentially putting hundreds of cases in jeopardy, KHOU reported.

“Just one example, we’ve got 400,000 pounds of marijuana in storage that the rats are the only ones enjoying,” Mayor John Whitmire told a news conference.

The problem is so serious that the district attorney for Houston has alerted defense attorneys in more than 3,600 open drug-

related cases and given police permission to destroy drug evidence from cleared cases from before 2015.

Joshua Reiss, general counsel at the Harris County District Attorney, said the pests got into marijuana as well as packaging containing mushrooms.

While the rodents may be going big in Texas, it’s a nationwide problem, Reiss reckons.

“Narcotics evidence rooms and evidence rooms in general...are filled to the brims with old evidence, it’s a national issue,” he said.

Police officials say the problem dates back decades. In March last year, cops in New Orleans found rodents consuming drugs in their department HQ’s evidence room.

“The rats are eating our marijuana,” NOPD Chief Anne Kirkpatrick told a city Criminal Justice Committee meeting at the time.

“They’re all high.”



New Africa – stock.adobe.com

## CALIFORNIA MAN SELLS AMANITA PHALLOIDES FROM HIS TRUCK

Allison Barfield

<https://www.msn.com/>, Jan. 7, 2025

Salinas Valley Health officials have issued a warning that poisonous mushrooms that look like a commonly eaten variety are being sold out of a truck.



*Amanita phalloides.*

Salinas Valley Health said that emergency room physicians treated three people who came into the ER on New Year’s Eve. The patients seemed to be suffering from acute hepatotoxicity, or liver toxicity, that was likely caused by severe mushroom poisoning after they cooked and ate Death Cap mushrooms [*Amanita phalloides*] being sold by a vender in a truck.

According to health officials, the truck was parked by a supermarket in East Salinas, but the owners could be operating from multiple locations.

The patients were treated and taken to Stanford Medicine in Palo Alto. It’s unclear how they’re currently doing. The physicians notified the Salina Police Department and reported the cases to the County of Monterey Public Health Department.

Signs of ingesting Death Cap mushrooms include nausea, vomiting, diarrhea, and stomach pain. If you experience any of these symptoms immediately seek emergency treatment.

If you eat Death Cap mushrooms, you might feel better after about 24 hours. However, you might need a liver transplant due to the damage the poison can cause.

Officials are urging residents to only eat mushrooms purchased from reputable outlets. This is the safest way to ensure you’re getting the correct variety.

## GLOBAL BLUEBERRY CRISIS RAPIDLY SPREADING ACROSS THE GLOBE

North Carolina State University  
<https://scitechdaily.com/>, Jan. 14, 2025

[abridged] A new study from North Carolina State University has traced the global spread of *Erysiphe vaccinii*, the species of fungus that produces powdery mildew in blueberry plants. Powdery mildew causes a white, powdery substance to cover host plants, stealing nutrients and retarding photosynthesis while keeping the host alive. Different species of powdery mildew affect different plants—wheat, hops, grapes, and strawberries, among others—“but these are genetically different from the ones spreading across the world on blueberries, said Michael Bradshaw, corresponding author of a paper published in *New Phytologist* describing the research.



Michael Bradshaw

*Powdery mildew on a blueberry leaf.*

Over the past 12 years, the fungus *E. vaccinii* has expanded from its original range in the eastern United States to several continents. The study showed that the disease was set loose globally

in two different introductions. One strain of the fungus found its way to China, Mexico, and California while a different strain wound up in Morocco, Peru, and Portugal. Bradshaw thinks humans are responsible for the spread as nursery plants traveled to foreign shores. “This is a hard organism to control,” Bradshaw said. “If you’re sending plant material across the world, you’re likely spreading this fungus with it.”

Bradshaw and his colleagues examined historic and modern plant leaves plagued by powdery mildew. The study included 173 samples from North America, Europe, Africa, and Asia. One sample from a North American herbarium was collected over 150 years ago, while the foreign samples were collected within the past five years.

Interestingly, genetic testing showed that none of the old specimens had the same genetic makeup as the fungi currently spreading throughout the world.

The study also showed that the *E. vaccinii* fungus found in blueberries in other countries appears to solely reproduce asexually. The fungus reproduces both sexually and asexually in the United States.

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## Election

## Election

## Election

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### Election Instructions

### Marian Maxwell

Our website has changed recently. Please read the following instructions carefully.

Elections are held electronically online. Voting is February 1st through March 9th at midnight. This year we will be voting for President, Secretary, and five Trustees for the years 2025–2027. Please read the following candidate profiles carefully. An email with the link to vote will be sent out on Feb. 1 to those on the PSMS mailing list.

Those not opting into the mailing list will need to go to our website at [www.psms.org](http://www.psms.org) and click on “Members’ Page” under “Membership.” Log in with your username and password.

On the page that opens, under “Engagement” click on “Elections.” This opens the 2025 PSMS election ballot. Make your selections and be sure to click on “submit” on the bottom of the ballot when finished.

If you have forgotten your password, please fill out the section “Forgot your password?” at the bottom of the page and click on “Reset your password.” If you cannot remember your username, contact Pacita Roberts at [membership@psms.org](mailto:membership@psms.org) or Marian Maxwell at [outreach@psms.org](mailto:outreach@psms.org).

Please note that some biographies in *Spore Prints* may have been abbreviated owing to space considerations. Online bios are as originally submitted. It will be helpful to have your *Spore Prints* issue with the candidates’ photos and bios available to view when voting since there is no way to post photos in the online election area.

You may only vote once. There are two votes per family membership; each person must log in separately and use their individual user ID to vote. There is one vote for single and student memberships. Please direct questions about voting to [elections@psms.org](mailto:elections@psms.org). Election results will be announced at the annual and general membership meeting on Tuesday, March 11th.

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## Officers

### Kelsey Hudson

### President

I joined PSMS in 2018. I’ve been active in the club ever since, volunteering wherever I can. I’m currently serving as a member of the Board of Trustees. I’m an aircraft mechanic by day, and very passionate about mycology, ecology, conservation, and the outdoors. I love sharing the knowledge I’ve learned being part of PSMS.



### Secretary

### Valerie Costa

I served on the board from 2021–2022 but had to resign to move for grad school (Master’s-Political Ecology). I have 20 years nonprofit management experience, focusing on climate advocacy. I’m drawn to PSMS because it brings people together to learn and be in the right relationship with the natural world.

Trustees

**Marion Richards**

I am currently co-chair for our annual wild mushroom show, have served on the PSMS board, offered mushroom dye demo and dye classes, and lead the dye workshop at the Ben Woo Foray. I enjoy meeting new and current members and want to welcome everyone into the wide range of mushroom and lichen interests!



**Derek Hevel**

I joined PSMS in 2013 and am currently one of the chairs of the wild mushroom show. I believe I can help make things happen and contribute to making PSMS even better. Two of my interests are strengthening the connection between the PSMS leadership and membership and updating our technology for easier communication.



**Clay Dawson**

My wife and I became members of PSMS about 7 years ago. This year we took the training and became field trip guides. I consider myself a beginner at mushroom ID and finding good habitat, but I'm learning. I have been looking for ways to become more active in the club and hope to contribute as a board member. I would appreciate your vote. Thanks.



**Laurie Wu**

Amid climate challenges, I turned to mushrooms' resilience. Over the past year, I've attended 90 percent of PSMS events—without a car! These experiences have become cherished memories. As a first-generation Chinese American technologist from farming and restaurant roots and a new PNW homeowner, I'm eager to give back to this community.



**Shannon Adams**

I am a 20-year PSMS member and former board member and am passionate about advancing mycology and community science. Besides collecting and describing *Cortinarius* mushrooms, I am a foray speaker, teach microscopy, and support DNA sequencing efforts. I love technology, but am motivated to use it to strengthen our community. I'd appreciate your vote!



**Marian Maxwell**

A long-time PSMS member, I currently chair the Outreach Committee and have served on the Policies/Procedures, ID, Communications, and Ben Woo Foray committees. I help determine PSMS website content, send out PSMS communications, and manage sign-ups for major PSMS events. A previous board member & President from 2010–2015, I hope to serve on the board once again.



**Lifeng Jin**

A mushroom enthusiast for 6 years, I have grown from an avid mushroom eater picking buckets of Matsutake to a PSMS field guide. I love introducing mushrooms of the PNW to everyone, and run local Chinese social media groups on mushroom hunting with thousands of members. I hope as a board member I can spread the influence of PSMS to an even broader audience.



**Pamela Pakker-Kozicki**

As a member of PSMS, I've volunteered at the 2023 and 2024 shows and have gone on five field trips. I want to increase my PSMS involvement by joining the board for two reasons: great people and stimulating educational opportunities. I also realize all-volunteer organizations really need member involvement.



**Pei Pei Sung**

A current board member, I have chaired the PSMS committee that awards scholarships to support fungal research and education. I am grateful for the windows into nature that PSMS has opened for me, and if re-elected, I will continue to support the inclusive, educational, and community-building values of PSMS.



**BEAUTIFUL OLD ADVERTISING CARDS WITH FUNGI**  
**Brian. S. Luther**

Since 1980 I've been an avid collector of mushroom-illustrated postage stamps, old postcards, and advertising cards with fungi, as well as poster seals or Cinderellas\* showing fungi.

In the late 1800s and early 1900s, advertising cards (also called trade cards) were often given out to customers at stores as a means of soliciting or of informing the public that a specific product was available. They often showed pretty or intriguing images on one side to get people's attention. These cards are especially delightful, colorful, rare, and very collectible. The art work and colors on many are exceptional.

In this article I'll introduce just a few of the many sets of fungus-illustrated advertising cards I have in my collections.

Below is a complete set of six cards from a German company called Liebig that were printed with great detail. This set is titled Essbare Pilze (edible fungi), but they also show poisonous mushrooms highlighted in a circle on the illustration side. The cards are not numbered, so I don't know the order. I also have the identical set, but in French instead of German. The back side of all these has the company's name and the product offered, and although the cards are German, the product is also mentioned in English, presumably to widen the appeal to other nations. The common names of the fungi shown are also noted. These were made in the year 1885.



Brian S. Luther



Set of six Liebig cards. Bottom left is enlarged to show detail.

There are different sets of mushroom advertising cards from the same company as well, but I show just a few examples.

Other companies that issued similar cards include Diamantine, Moser-Roth's, Voelcker Cichorien, Dr. Thompson's, Kuenzer & Comp., Chocolat D'Aiguebelle, Stollwerck, etc. I have a gorgeous set of 20 cards from Jordan & Timaeus, a Dresden confectionery company. I show one of them here along with three advertising cards with scenes of people hunting truffles with both dogs and a pig.



Brian S. Luther

One of a set of 20 cards from Jordan & Timaeus.



Brian S. Luther



Brian S. Luther

Three advertising cards showing truffle hunting.



Brian S. Luther

Notice on the card with the pig that the person controlling it is struggling to keep the pig from eating the truffles! Pigs want to eat the truffles. That's why some very old time truffle hunters using pigs have fingers missing, after fighting with their pig for the truffles found. Pigs have been banned for truffle hunting in Italy since 1985 because they're so destructive of the environment when digging for them. One of these cards is very unusual in showing a scene of truffle hunting in snow in winter.

\*A Cinderella is a label that looks like a postage stamp but is not issued by the government for postal use.

Finally, I show two sets of gorgeous fold-out advertising cards still attached to one another (12 cards per set), both by Adolf J. Titze of Austria.



Two sets of fold-out cards by Adolf J. Titze.

This should at least give you an introduction into the world of old fungus-illustrated advertising cards. I hope you enjoyed seeing them.

## SWISS SCIENTISTS HAVE TAUGHT FUNGI TO GENERATE ELECTRICITY. HOW DO MUSHROOM BATTERIES WORK?

Lottie Limb

<https://www.euronews.com/>, Jan. 11, 2025

Fungi could be used to power batteries in remote regions thanks to a new breakthrough by Swiss researchers.

Their fungal battery invention is 3D-printed—with fungal cells mixed into the printing ink—and has the unusual advantage of being biodegradable. Once it's served its purpose, the battery digests itself from the inside.

It adds to the growing body of research using fungi—a vast and “under-utilized” kingdom of life—to make everything from our clothes and homes to meat alternatives.

Here's how the fungal battery, developed at the Swiss Federal Laboratories for Materials Science and Technology (Empa), is able to generate electricity.

### Meet the Living Battery that Needs Feeding

Strictly speaking, Empa researchers explain, the battery is a microbial fuel cell.



The yeast electrode (L) and white rot electrode (R).

Like all living things, microorganisms convert nutrients into energy. Microbial fuel cells make use of this metabolism and capture part of the energy as electricity.

“For the first time, we have combined two types of fungi to create a functioning fuel cell,” says Empa researcher Carolina Reyes.

On the negative (or anode) side of the ‘battery’ is a yeast fungus whose metabolism releases electrons. It is complemented by a white rot fungus on the positive (cathode) side which produces a special enzyme, allowing the electrons to be caught and conducted out of the cell.

The fungi feed on simple sugars, which are added to the battery cells. “You can store the fungal batteries in a dried state and activate them on location by simply adding water and nutrients,” explains Reyes.

### How are Fungal Batteries Made?

The fungi are not “planted” into the battery, so to speak, but are part of its material foundation from the start.

It is 3D printed to structure the electrodes in a specific way that gives the microorganisms easy access to the nutrients—no mean feat for the cross-disciplinary researchers.

“It is challenging enough to find a material in which the fungi grow well,” says Gustav Nyström, head of Empa’s Cellulose and Wood Materials lab.



“But the ink also has to be easy to extrude without killing the cells—and of course we want it to be electrically conductive and biodegradable.”

The grid printed electrode contains the fungus used in the anode compartment of the battery.

Thanks to their laboratory’s extensive experience in 3D printing of soft, bio-based materials, the team was able to produce a suitable ink based on cellulose. The fungal cells can even use the cellulose as an additional nutrient, and so help to break down the battery after use.

### Where Could Fungal Batteries Be Used?

Big mushroom-powered electronics are still a stretch, as these living cells do not produce a great deal of electricity.

But they could supply enough to power a temperature sensor for several days, for example, for agriculture or research in remote regions.

And the researchers are yet to get to the bottom of fungi’s full potential.

“Fungi are still under-researched and under-utilized, especially in the field of materials science,” agree Reyes and Nyström.

The researchers now plan to make the fungal battery more powerful and longer-lasting—and to look for other kinds of fungi that could supply electricity.

## FUNGAL SPORES OF THE MOLD *ASPERGILLUS FUMIGATUS* PRODUCE AN ENZYME THAT WEAKENS THE IMMUNE SYSTEM

Friederike Gawlik

<https://www.msn.com/>, Jan. 21, 2025

*Aspergillus fumigatus* is a mold that is found all over the world. Unlike closely related species, it can cause serious, often fatal in-

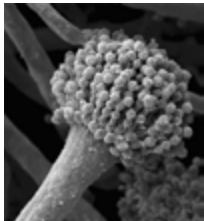
cont. on page 8

## Proteins on *A. Fumigatus* Spores, cont. from page 7

fections in humans. What makes *A. fumigatus* so dangerous? An international research team led by Gustavo Goldman from the University of São Paulo in Brazil has found clues to the cause.

A special enzyme on the surface of the fungal spores—glycosylasparaginase—apparently suppresses the release of pro-inflammatory substances by immune cells, making it easier for the pathogen to spread unhindered in the tissue. The findings are published in the journal *Nature Microbiology*.

Scanning electron micrograph of a spore carrier of *Aspergillus fumigatus*.



Jeannette Schmaier-Ripcke/Leibniz-HKI

“Gustavo Goldman’s group was particularly interested in the surface proteins on the spores, as these are the first to come into contact with the immune system—usually through inhalation,” reports Olaf Kniemeyer from the Leibniz Institute for Natural Product Research and Infection Biology—Hans Knöll Institute (Leibniz-HKI), the German partner of the study.

Kniemeyer is a proteomics expert. Together with his team, he analyzes all the proteins in a cell and assigns functions to them. This is how he finds potential targets for new active substances. The researchers from Jena also specialize in phagocytosis, a defense mechanism in which immune cells devour foreign invaders. This also enabled the international research team to study the interaction of the fungus with immune cells.

In the current study, they used an approach called trypsin shaving: with the help of trypsin, a protein-cleaving enzyme, they removed all proteins from the spore surface and analyzed their fragments in a mass spectrometer.

Using database comparisons, they were able to identify 62 proteins that only occur on the spores of *Aspergillus fumigatus*, but not on closely related species. Some of them could therefore play a role in the infection process.

To test this, the researchers created a knockout library with 42 mutants of the fungus, in each of which a gene coding for one of these proteins was switched off. The mutant that lacked the glycosylasparaginase triggered an increased release of interleukin-1 $\beta$  in immune cells.

Interleukins are highly effective proteins that trigger fever, inflammation, and a range of other immune reactions even in the smallest of quantities, thus boosting the body’s defense against pathogens.

If the glycosylasparaginase on the fungal spores is missing, the immune system can release more of this inflammatory substance. Immune cells are activated and are better able to fight off the fungus. Conversely, this indicates that the glycosylasparaginase produced by the fungus normally helps to dampen the immune response. This allows the fungus to infect the body almost unhindered.

The study in the mouse model supports this hypothesis: in mice with an intact immune system, the fungus was attacked more strongly by the immune system when the gene for glycosylasparaginase was previously switched off.

“The glycosylasparaginase on the spores of *Aspergillus fumigatus* therefore plays a role in the fight against the immune system. However, we cannot yet say exactly how this mechanism works,” says Kniemeyer, summarizing the results of the study.

The findings can help to develop new therapies for infections with *Aspergillus fumigatus*. This is urgently needed, as there are currently only a few effective drugs to combat fungal infections, and resistance to them is gradually spreading.



### Friederike Luise Asif 1943–2024

We are sorry to announce that our beloved PSMS member Luise Asif passed away in her sleep on Friday Dec. 27, 2024. Luise joined PSMS on Jan. 1, 1995, and became one of our most dedicated volunteers. Luise received our Golden Mushroom award for a lifetime of service in 2016.



Her service for PSMS was extensive: 2011–2015 PSMS Board of Trustees; 2015–2021 PSMS Secretary; 2002–2020 Monthly Meeting Hospitality Chair; 2015–2021 Volunteer Coordination Chair; 2017–2022, Bridle Trails Study coordinator; 2017 Survivor’s Banquet Chair; 2016–2023 Ben Woo Foray Committee. She helped with many other committees and volunteered at all of our Annual Wild Mushroom Shows since she joined. She was a gentle, humble person preferring to work quietly in the background, always present, always generous with her time. We will miss her friendship and her presence, but she will remain in the hearts of those of us who knew her. We offer our condolences to her husband, Safdar, and her family as well as to her many friends.