

September 2022, Issue 9, Volume 84

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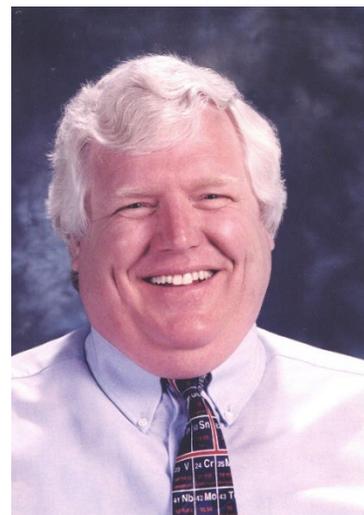
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Looking for material for *The Vortex*. If you have material you think is worthy, submit it to the Donald.maclean.acs@gmail.com. I am looking for book reviews, tv reviews, and topics that are less popular like nuclear and NIMBY (homeless, the refuse, hazmat).



California Section
American Chemical Society



All are welcome
Saturday, September 10, 2022

Title

Moving the Needle: How key interventions can increase diversity, equity, and inclusion in STEM

Time

10:30 – 11:00 am
Chatting

11:00 am
Talk and Discussion

Reservation

Please visit the CalACS website www.calacs.org to register for this meeting or use Brown Paper Tickets.

RSVP here.

Please register before Thursday, September 8, 2022, 12 noon. Your email address is needed to send the ZOOM link, which will be shared with attendees on or before the day of the event via Brown Paper Tickets.

Cost

Free

About the Speaker



Malika Jeffries-EL, PhD

Malika Jeffries-EL is the Associate Dean of the Graduate School in Arts and Sciences and Associate Professor in the Department of Chemistry and Division of Materials Science at Boston University. Dr. Jeffries-EL's research focuses on the development of organic semiconductors –materials that combine the processing properties of polymers with the electronic properties of semiconductors. She is a fellow of the American Chemical Society and the Royal Society of Chemistry and has won numerous awards including the Percy Julian Award from the National Organization

of Black Chemist and Chemical Engineers (NOBCChE), the ACS-Women Chemist Committee Rising Star award, the Iota Sigma Pi Agnes Fay Morgan Award, and the Stanley J. Israel award for diversity. She has authored over 40 publications, received over 4000 citations, and given over 175 invited lectures domestically and abroad.

Professor Jeffries-EL, is also a staunch advocate for diversity and a dedicated volunteer that has served in several activities within the American Chemical Society. She is a science communicator who seeks to encourage students from underrepresented groups to pursue STEM degrees and recently appeared on the NOVA series Beyond the Elements. She also serves the community through her work with Alpha Kappa Alpha Sorority, Incorporated (AKA).

Abstract

Although African Americans make up approximately 13% of the US population, they are severely underrepresented in advanced degrees awarded in STEM disciplines. Currently, they hold ~2% of tenure/tenure track positions in research institutions in the US. Despite the overwhelming statistics, Dr. Jeffries-EL pursued and completed a doctorate in chemistry, obtained an academic job, and then tenure in promotion in due course. She was born in Brooklyn, NY where she lived in public housing and attended public school. Although her situation was less than ideal, she always had a passion for science that her parents encouraged her to pursue. In this talk, Dr. Jeffries-EL will discuss what excites her about science, diversity, equity and inclusion issues and potential solutions woven all within the context of her personal experiences.

Questions?

Please contact Elaine Yamaguchi at eyamaguchi08@gmail.com

The Solano Stroll is Back – Sunday, September 11th, 10 AM to 5 PM!



The Solano Stroll is back, and Cal ACS will be there!

There will be science fun for all ages, and you can help us present hands-on chemistry activities. No special training or experience required, just your enthusiasm and love for science. Our booth near the corner of Fresno Street and Solano Avenue will feature UV-color-changing beads and textile chemistry with natural dyes, as we launch the [National Chemistry Week theme for 2022](#):

Fabulous Fibers; the chemistry of fabrics
Fibras Fabulosas; La Química de las Telas

Please contact your [National Chemistry Week Coordinator](#) (alexmadonik@sonic.net) if you can be there.

Alex Madonik

Science in the Park (Hayward) October 1, 2022

By Alex Madonik

We're invited to [Science in the Park](#), hosted by Alameda County Supervisor [Richard Valle](#) at CSU EastBay in Hayward on Saturday, October 1st, 9 AM to 3 PM. We could use a few more volunteers. I expect we'll present the same activities as at the Solano Stroll.

Details to follow. See the Calacs.org website for detail that will follow after this publication date.

Oct 3 – Social Networking – LA Angels Vs Oakland A's Game (Oakland)

Organizer: Fanny Frausto

We are putting together a social at the LA Angels vs Oakland A's baseball game for October 3, 2022. See calacs.org web site for details. Currently the game is set to start at 6:40 pm.

2022 Bay Area Chemistry Symposium

Organizer: Patrick Lee

Date: November 10, 2022

Location: Pauley Ballroom (UC Berkeley)
2495 Bancroft Way Berkeley, CA / Hybrid

This symposium, unique in the Bay, will provide an ideal forum for students, postdocs, and industrial chemists to meet and exchange ideas covering themes in chemical biology, synthesis, and computational chemistry. The 2022 symposium will feature keynote seminars from leading local academics & industrial chemists, as well as short talks from students, post-docs, and industry researchers. A lively poster session promises a much-anticipated return to networking with local chemists through this opportunity to learn about cutting-edge chemistry happening across the Bay Area's outstanding institutions.

This year's featured academic speakers:

Prof. Tom Maimone - UC Berkeley

Prof. Annaliese Franz - UC Davis

Prof. Ian Seiple - UCSF

Sponsors:

AbbVie, ACS, Cytokinetics, Maze
Therapeutics, Merck, Novartis, Nurix

Ascendis, Eikon Therapeutics, Genentech,
Schrodinger

See calacs.org web site to register. Seats will be limited to 250 people and an additional limit on the number of people from the same institution.

Cost: TBA

ChemLuminary Award for Senior Chemists Committee

The California Section was recognized with one ChemLuminary Award for our Senior Chemists Committee event, organized by Lee Latimer and offered in conjunction with the Huron Valley Section during the fall 2022 ACS National Meeting in Chicago.

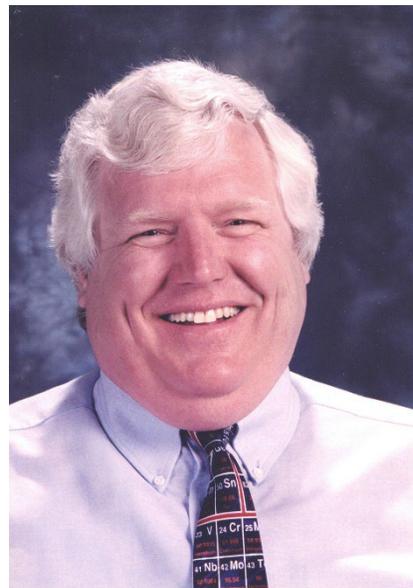
Jim Postma Has Been Named ACS Fellow

By Fanny Frausto

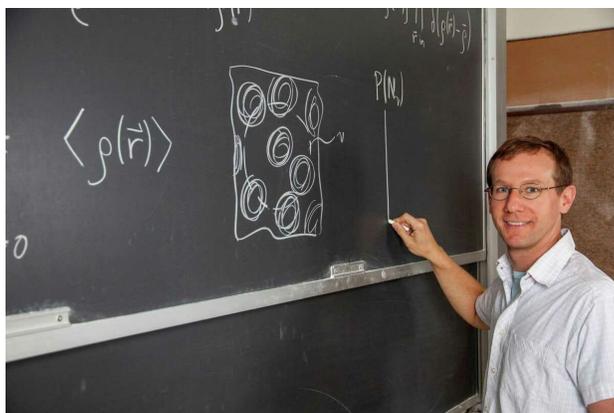
I want to announce that Jim (Jim Postma, California State University, Chico) has been named an ACS Fellow. He joins the 45 Fellows that were named this year. Our section has been blessed with many Fellows and I am so pleased to have Jim join the ranks. Please take a look at the announcement in C&EN at the link below.

<https://cen.acs.org/acs-news/programs/Announcing-2022-ACS-fellows/100/web/2022/07>

Congrats Jim - very well deserved. And thank you all who contributed to this nomination who made this possible!



UC Chemistry Professor Phillip Geissler



From SF Chronicle.¹

“Phillip Geissler, beloved UC Berkeley professor, dies at 48 while hiking in Utah” is the title of the San Francisco Chronicle notice from July 28, 2022. This announcement was also on TV. See references for more information.

References:

- 1 <https://www.sfchronicle.com/bayarea/article/A-beloved-UC-Berkeley-chemistry-professor-died-on-17335765.php>
- 2 <https://www.kron4.com/news/bay-area/uc-berkeley-professor-dies-after-hiking-in-utah/>

Changes Coming to ACS Membership Structure

By Donald MacLean

In the June 13, 2022 edition of CEN, an article titled “Welcome to the Future of Membership” by Laura Sremaniak explains the new membership categories with different pricing schemes. There are some interesting items such as reduced fees, a la carte items, and, more importantly, Community associate for \$0. Lee Latimer provided the Executive Committee a preview to this and the possible decline in local section member numbers with redefining active member to those that are paying members, and those that are delinquent reclassified as community associates (\$0). That said community members and delinquent payment members will still count as ACS members.

As of this writing, the Regular membership will have 2 levels: premium at \$160, and standard at \$80. Recent graduate will have a 1 year 50% discount. All other categories will have 1 level,

either Premium or Basic. There is no list for international members (I was an international member when working abroad).

California Local Section Voluntary Dues are \$19 / year.

Membership Category	Description	Price	Additional Info
Premium	Access to all benefits. The best option for students, professionals, or retired, now at a better price.	\$160	Regular Members & Society Affiliates
		\$80	Recent Graduates* ⓘ
		\$55	Graduate Students
		\$25	Undergraduate Students
		\$80	Retired
		\$0	Emeritus
			Join ACS
			Renew Membership
			<ul style="list-style-type: none">Gain access to all benefits in the Standard Package plus:Up to a 40% discount on ACS Meetings & Events registration feesACS Publications and Author BenefitsAccess to the ACS Webinars® Library25 activities annually through CAS SciFinder®ACS Course and Workshop Discounts
Standard	A new option featuring a slimmed-down set of benefits at half the price.	\$80	Regular Members
		\$40	Recent Graduates* ⓘ
			Join ACS
			<ul style="list-style-type: none">Weekly Issues of Chemical & Engineering News (C&EN) digital editionQuarterly ACS Discovery ReportsMember-only awards, grants, and fellowshipsFirst-time members can join up to 3 Technical Divisions in their first year
			Compare member benefits
Basic	Introductory set of complimentary benefits.	\$0	Community Associate
			Join ACS
			<ul style="list-style-type: none">Access limited benefits and scientific contentIntroduce yourself to the ACS community and connect with a global network of professionalsStay connected to the field and gain scientific insights
			Compare member benefits

Figure. July 24, 2022

<https://www.acs.org/content/acs/en/membership.html#pricing>

The Irony of Iron

Part 7

by
Bill Motzer



In Parts 5 and 6 of this series (May and June 2022 The Vortex), I discussed how mantle plumes brought iron from planetary cores to planetary crusts. Dissolved Iron in Earth's oceans gave rise to complex life allowing organisms to develop blood hemoglobin. At about 385 million years ago (Ma) some oceanic vertebrates (e.g., fish) evolved to become land dwelling by exchanging gills for lungs. Therefore, because of more efficient circulatory systems using iron, complex organisms expanded their domain landward.

However, not all plumes are so “benevolent” and at least one is theorized to have nearly eliminated most complex life. The geologic record suggests that there have been at least five significant extinctions to life on Earth. The most well-known is the dinosaur extinction event that occurred about 65 Ma from an asteroid impact that wiped out perhaps 75% of planetary species (see *The Impacts of Impacts* – March and April 2010 The Vortex). Less known is the most severe extinction event known that occurred at the end of the Permian Period (about 252 Ma) in which perhaps 70% of all land vertebrates, particularly the amphibians, and 90% of all marine life died out. This extinction event allowed for the rise of the dinosaurs in the subsequent Triassic Period (beginning about 252 to about 201 Ma).

So what caused this massive extinction event? The prevailing theory is that a massive volcanic eruption in present-day Siberia from either a stationary or slow moving mantle plume (hot spot) pumped enormous quantities of CO₂ and SO₂ into the atmosphere resulting in major effects to the terrestrial and oceanic biosphere. These eruptions occurred over a rather brief geologic time period of about one million years. The Siberian eruptions (aka Siberian Traps, Siberian Large Igneous Province or LIP) covered an area of about 7 million km² with a volume of approximately 4 million km³. The rocks are largely basaltic in composition (**Figure 1**).

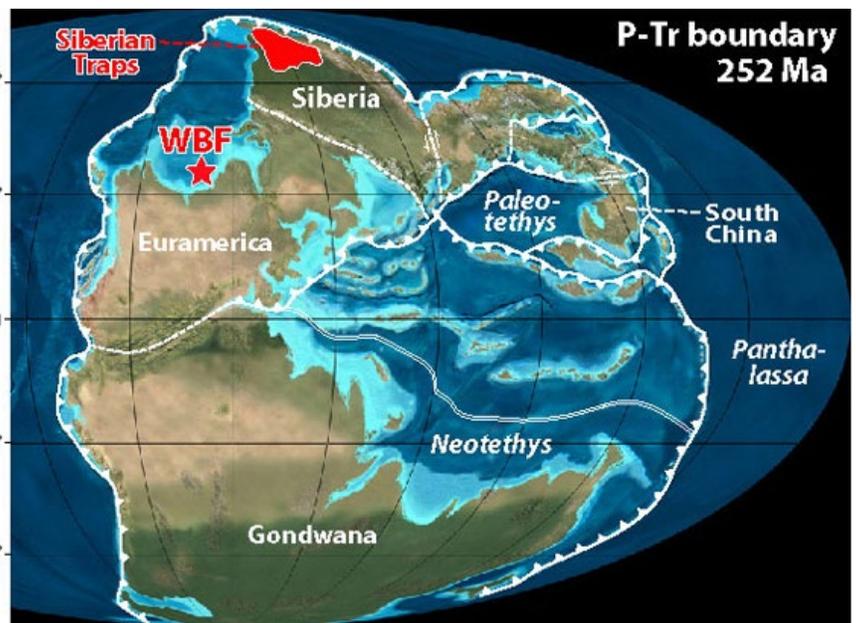
Also, underlying the traps is a large sedimentary basin known as the Tungas Syneclise, containing both early to mid-Paleozoic (~525 to ~375 Ma) thick carbonate and evaporite deposits and Carboniferous-Permian (~350 to ~275 Ma) aged coal-bearing clastic rocks. The heating of such rocks may also have contributed additional missions of large amounts of CO₂, SO₂, and CH₄.



Figure 1: Present location of Siberian traps – a geologic/geomorphic term derived from the Swedish word for stairs ("trappa"): referring to the step-like hills forming the regional landscape. Map source: <http://www.athenapub.com/aria1/PAL/siberia1.html>.

The geologic record indicates that Earth’s biosphere was significantly perturbed for at least 5 to 8 million years before recovery began in the early Triassic Period (about 237 to 234 Ma). World-wide anoxia (anaerobia) – particularly in Earth’s oceans followed (**Figure 3**). An indicator of such anoxia is the presence of framboidal pyrite (FeS₂) in end Permian and early Triassic Period sediments. Framboids are a micromorphological feature common to certain sedimentary minerals, particularly pyrite. The term is derived from the French “la framboise” meaning “raspberry” reflecting structural appearances under magnification (**Figure 4**). Such structures form spherical aggregates averaging from 5 to 20 μm in diameter.

Figure 2: Location map of Siberian traps during the end Permian extinction event at 252 Ma. Source: map by T. Algeo (2012), <https://spaceref.com/press-release/global-extinction-gradual-doom-as-bad-as-abrupt/>.



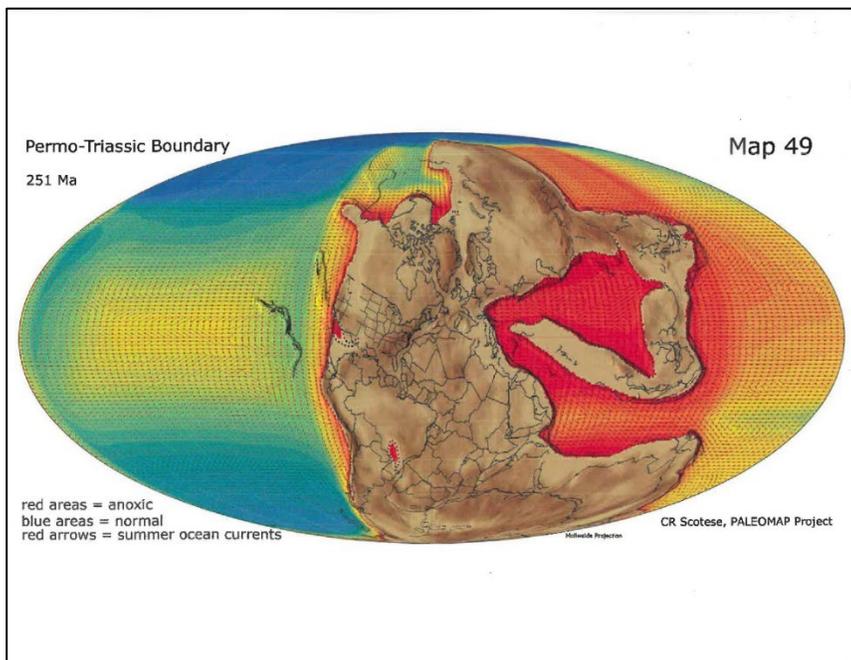


Figure 3: Anoxia occurrences in Earth's oceans during the end Permian (252 Ma) event. Red areas indicate anoxic environments, yellow suggest euxinic environments and blue indicates normal environments. Source: Scotese and Moore (2014).

What happened was that, in addition to significant declines of dissolved oceanic oxygen, dissolved iron was reduced to pyrite, which was subsequently deposited and/or accumulated in sediments. Oceanic areas with complete oxygen removal are considered as anoxic. Where only partial oxygen removal occurs, the term euxinic is used (see Table 1 in Bond and Wignall, 2010). Also, the type (morphology) and size of the framboids may indicate the degree of anoxia, thereby showing biosphere recovery as oxygen and iron concentrations improved to pre-extinction levels.

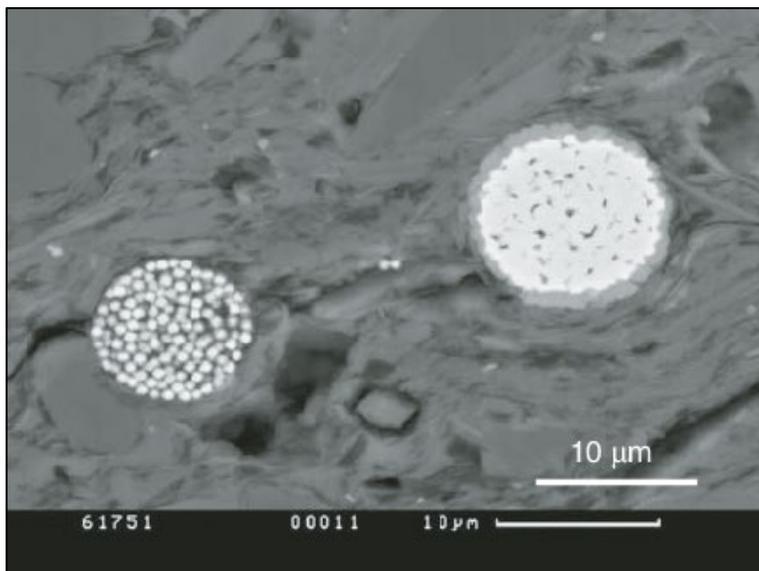


Figure 4: Scanning electron microscope (SEM) image of pyrite (FeS_2) framboids in end Permian sedimentary rocks. Source: Bond and Wignall (2010).

References:

Benton, M.J., 2005, *When Life Nearly Died: The Greatest Mass Extinction of all Time*. London: Thames & Hudson Ltd., UK Publishers, 336 p.

Benton, M.J., 2018, *Hyperthermal-Driven Mass Extinctions: Killing Models During the Permian–Triassic Mass Extinction*:

<https://royalsocietypublishing.org/doi/10.1098/rsta.2017.0076>

Bond, D.P.G. and Wignall, P.B., 2010, *Pyrite Framboid Study of Marine Permian-Triassic Boundary Sections: A Complex Anoxic Event and its Relationship to Contemporaneous Mass Extinction*: Geological Soc. Of America Bull., v.122, no. 7/8, pp. 1265-1279.

Scotese, C.R., and Moore, T.L., 2014, *Atlas of Phanerozoic Oceanic Anoxia (Mollweide Projection)*, v. 1-6, PALEOMAP Project for ArcGIS, PALEOMAP Project, Evanston, IL, Map 49.

Stanley, G. 2022, *Mass Extinctions in Geologic Time and What We Learn from Them*: June 29, 2022 presentation to the Northern California Geological Society (NCGS). www.ncgeolsoc.org.

Monkeypox (Mpox) Vaccines

Review by Donald MacLean

Monkeypox (new name is Mpox ?) has led the news reports as the 1, 2, or 3 headline topic in our local news program in July and first half of August. Unlike Covid 19, this outbreak is not an epidemic, but has been classified as a public health emergency by the State, and later by the USA government. Unlike Covid 19, there are vaccines available and the lines to get the vaccine are long. The vaccine that is being administered is Jynneos. This is in short supply, so an alternative may be used under some circumstances. This alternative is used like the Smallpox vaccine that the military used to administer, leaving a scar at the site of administration. Before using the ACAM2000, the patient insert should be read and understood as the route of administration. Both vaccines are approved for Smallpox. The Table below show some information showing the difference between the two FDA approved vaccines as obtained from the patient inserts.

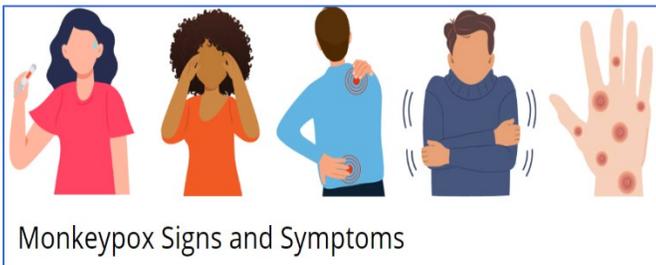


Figure from <https://www.cdc.gov/poxvirus/monkeypox/index.html>.¹

What is interesting is how different the virus type, formulation components, and the delivery method for the two products.

In a new development the FDA is considering cutting the 0.5 cc dose for adults to 0.1 cc dose intradermal in an effort to increase the available supply (August 9, 2022).

Elsewhere Japan's Health Ministry on August 1, 2022 has approved KM Biologics Company's Smallpox freeze-dried vaccine LC16 KMB against Monkeypox using the

traditional scarification method. However, KM Biologics does not list the vaccine as a product or in their pipeline.² No additional information can be obtained at this time.

In Canada and EU only Jynneos (also known as Imvamune in Canada, Imvanex in EU) is approved.

In 2018 Emergent BioSolutions bought out Sanofi Pasteur contract with the CDC to produce ACAM2000.³ No other information found. However, Emergent Biosolutions bought out the rights to Brincidofovir the first FDA approved antiviral to treat smallpox regardless of a patient's age.⁴

The future of Jynneos may have a different dosage appearance. Bavarian Nordic, the producer of Jynneos has a Phase III freeze-dried version in their pipeline.⁵ This will be an improved shelf-life and storage condition to replace the stockpile of the liquid-frozen version (Cold chain issue).

Table 1 shows the side-by-side comparison for Jynneos and ACAM2000.

Table 1. Comparing Jynneos versus ACAM2000 Monkeypox Vaccines		
Product Name	Jynneos (in USA) ⁸	ACAM2000 ⁹
Alternate Names	Imvamune (in Canada) or Imvanex (in EU) ⁶	
Proper Name	Smallpox and Monkeypox Vaccine, Live, Non-Replicating	Smallpox [Vaccinia] Vaccine, Live
Approved for	Licensed for monkey pox or small pox	Approved for small pox
Type	Live Vaccinia Virus not replicate efficient	Live Vaccinia virus replication competent
USA approval	2019	2007
Other's approval	EU 2013, Canada 2013	Australia 2009
Dosage Form	Suspension for subcutaneous injection	Lyophilized preparation for percutaneous scarification
Dosage and administration	0.5 cc sc 2 times 28 days apart ^{1,3}	1 percutaneous vial multiple puncture technique with bifurcated needle, use 15 jabs
Maximum development time	14 days after second dose	4 weeks
Appearance	Milky, light yellow to pale white colored suspension	None provided
Formulation	0.5 x 10 ⁸ to 3.95 x 10 ⁸ per 0.5 mL infectious units of MVA-BN live virus 10 mM Tris (tromethamine), 140 mM sodium chloride pH 7.7. No preservatives.	1.0-5.0 x 10 ⁸ plaque-forming units (PFU)/mL or 2.5-12.5 x 10 ⁵ PFU/dose 6-8 mM HEPES, 2% human serum albumin, 0.5 – 0.7% sodium chloride, 5% mannitol pH 6.5-7.5
Recon time / swirl	Swirl 30 sec (liquid)	Not stated
Diluent	NA	50% (v/v) Glycerin, 0.25% (v/v) Phenol, Water for Injection Use 0.3 mL of the 0.6 mL provided.
Container	Single-dose vials	Multiple-dose 3 mL clear glass vials
Storage	Keep frozen at -25°C to -15°C. Store in the original package to protect from light. Do not re-freeze a vial once it has been thawed. Once thawed, the vaccine may be kept at +2°C to +8°C for 12 hours.	Store at average - 15°C to -25°C. After reconstitution, may be administered during a 6 to 8 hour workday at room temperature (20-25°C). Reconstituted ACAM2000 vaccine may be stored in a refrigerator (2-8°C) no longer than 30 days, after which it should be discarded. Diluent stored at room temperature (15-30°C).
Shelf life (EU / Australia)	2 years at -20°C ± 5°C 5 years at -50°C ± 10°C 5 years at -80°C ± 10°C	The expiry date can be found on the packaging
Grown in	Chicken Embryo Fibroblast (CEF) cells	African Green Monkey kidney (Vero) cells
¹ May be 0.1 cc intradermal in the future.		
⁶ Note in EU if you had a smallpox vaccine previously only 1 dose is given.		

Table 2 shows the formulation and their purpose. ^{8,9}

Table 2. What are the excipients possibly used for?			
	Jynneos	ACAM2000 Lyophilisate	ACAM Diluent
pH Buffer	10 mM Tris	6-8 mM HEPES	NA
Stability /Osmolality	140 mM Sodium chloride	0.5 to 0.7% Sodium chloride	NA
Stability	NA	2% Human Serum Albumin	NA
Bulking agent	NA	5% Mannitol	NA
Prevent drying out	NA	NA	50% (v/v) Glycerin
Preservative	NA	NA	0.25% (v/v) Phenol

References:

- 1 Center for Disease Control -<https://www.cdc.gov/poxvirus/monkeypox/index.html>
- 2 KM Biologics - <https://www.kmbiologics.com/en/products/vaccines.html>
- 3 <https://www.fiercepharma.com/vaccines/emergent-biosolutions-buys-sanofi-s-smallpox-vaccine-for-125m>.
- 4 <https://www.fiercepharma.com/pharma/emergent-beefs-countermeasure-repertoire-325m-deal-chimerixs-smallpox-newcomer-tembexa>
- 5 Bavarian Nordic - <https://www.bavarian-nordic.com/what-we-do/pipeline/smallpox.aspx>
- 6 European Medicines Agency - https://www.ema.europa.eu/en/documents/product-information/imvanex-epar-product-information_en.pdf
- 7 Joh Cohen, Monkeypox outbreak questions intensify as cases soar, Science, 20 MAY 2022, 376 (6596): 902-903. doi: 10.1126/science.add1583
- 8 Jynneos Package Insert - <https://www.fda.gov/media/131078/download>
- 9 ACAM2000 Package Insert - <https://www.emergentbiosolutions.com/wp-content/uploads/2022/01/ACAM2000-Product-Information.pdf>

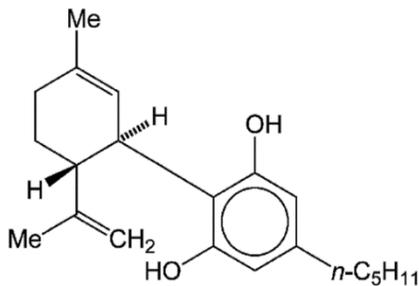
What is the Beef on Feeding CBD to Horses and Companion Animals?

By Donald MacLean

An article in a farmer-oriented newspaper states that the FDA has sent warning letters to four companies that were selling unapproved cannabidiol, CBD, products for food-producing animals.¹

CBD is a THC ((-)-trans- Δ^9 -tetrahydrocannabinol) isomer. Cannabidiol (CBD) is the term for a family of cannabinoids that are isomers of THC, the chief psychoactive component of marijuana. These compounds are not psychoactive, but they are useful for controlling pain and other medical conditions. On June 25, 2018, FDA approved an oral solution of CBD for treating seizures from two severe forms of epilepsy (Epidiolex®).² The FDA has the authority over food, drugs, medical devices, and cosmetics (1938 law is based on ethylene glycol poisoning from [elixir sulfanilamide](#))³, but drug supplements fall into a grey area. FDA regulates both finished dietary supplement products and dietary ingredients, however this is under a different set of regulations than those covering "conventional" foods and drug products. Manufacturers and distributors of dietary supplements and dietary ingredients

are



Chemical Structure of CBD.⁴

prohibited from marketing products that are adulterated or misbranded. This is how the FDA was able to remove the elixir sulfanilamide by claiming the product was mislabeled as the elixir contained no alcohol.

What's the beef (chevaline)?

Drug Clearance.

The urban chicken farming trend has gotten a lot of people to grow their own food. Antibiotics receives the most attention due to antibiotic resistance and potential allergic responses. However, other drugs are a concern. In many cases a drug may be approved in turkeys but used in chickens (so called off label use) with the label only indicating it was tested in turkeys. In this example there was a 2-week minimum "do not eat eggs" label statement notice. With CD/T (tetanus toxoid) there is a three week "do not use before slaughter" label statement. In the CBD case it appears these four companies are directing CBD products towards horses, an animal that is illegal to sell for slaughter in the USA. In one case they are putting out a large net to cover other livestock. However, reviewing the web site 2 weeks after the article came out, the concern is CBD is going to be fed to food bearing livestock.

The article discusses one company not receiving the warning letter, but told about the notice through a third party. They are working on relabeling their product. For a second company the CBD Hemp pellets product was labeled "for equine and livestock". I would

imagine the remedy is to properly label and market their product.

The 1 oz tincture contains 30 doses of 25 mg CBD (1 oz tincture sells for \$70). The hemp pellets contain minimum 100 mg CBD per Tablespoon (I am assuming 5 mL size). One and a quarter pounds of pellets contains a 60-day supply at 200 mg per day. \$90 for 1

month supply. From experience, if an animal likes this stuff more than 2 tablespoons per day is likely.

Just for comparison, a bale of grass hay / alfalfa is \$22 as of July. If a bale weighs 120 pounds and a horse eats 20 pounds a day, that amounts to \$4 / day to feed it. This is like doubling your costs.

References:

- 1 Sierra Dawn McClain, "FDA Warns Against CBD Products for food-Producing Farm Animals", Capital Press, June 17, 2022 (print issue).
- 2 <https://www.fda.gov/news-events/press-announcements/fda-approves-first-drug-comprised-active-ingredient-derived-marijuana-treat-rare-severe-forms>

3

<https://www.fda.gov/files/about%20fda/published/The-Sulfanilamide-Disaster.pdf>

4

<https://www.acs.org/content/acs/en/molecule-of-the-week/archive/c/cannabidiol.html>

More Air Quality Maps

By: Donald MacLean

Remember the good old days when you could see the air that burned your eyes? Then the air got clean with all the emission controls on power plants and cars. Now we have a new source of air pollution that burns the eyes and gives headaches - fires. The summer months mean smoke and fire. There is another map that the US government has created that can be accessed for air quality. This one also shows fire location and plumes, but not the reading for particles. Note there is another air quality map put out by PurpleAir that gives air quality values derived by a different set of sensors and testing intervals.

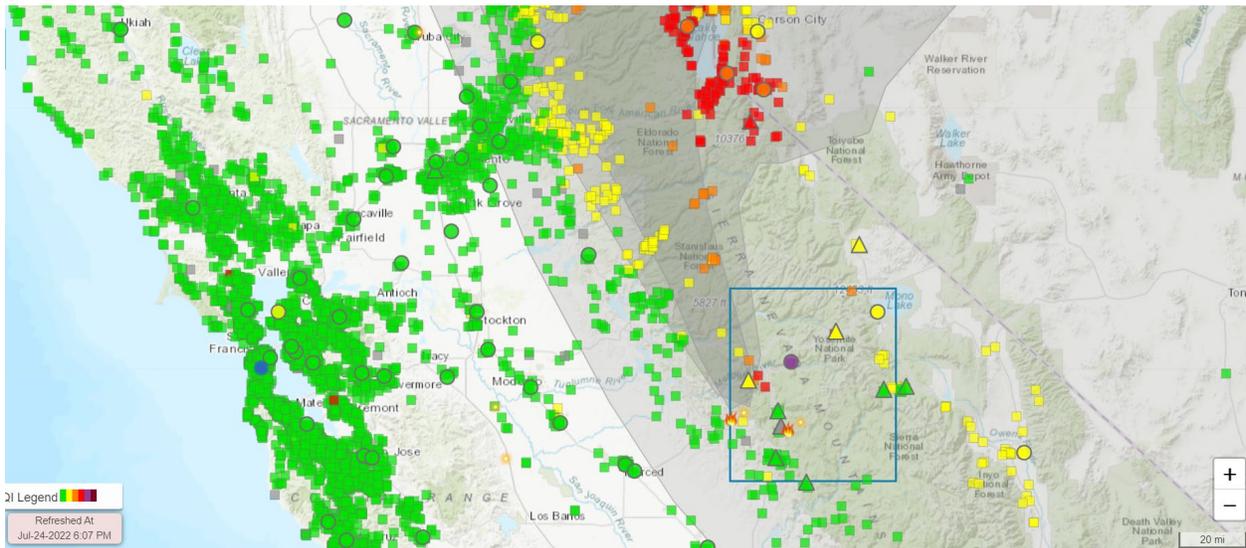


Figure. Fire and Smoke Map. Note that flame and smoke plume is noted in map.¹

Check out the Fire and Smoke Map. This is not the same thing as Purple Air that was mentioned in a previous article.² The AirNow Fire and Smoke Map provides information that you can use to help protect your health from wildfire smoke. Use this map to see:

- Current particle pollution air quality information for your location;
- Fire locations and smoke plumes;
- Smoke Forecast Outlooks, where available; and,
- Recommendations for actions to take to protect yourself from smoke. These recommendations were developed by EPA scientists who are experts in air quality and health.

The Map is a collaborative effort between the U.S. Forest Service (USFS)-led Interagency Wildland Fire Air Quality Response Program and the U.S. Environmental Protection Agency (EPA).

The PurpleAir sensors measure airborne particulate matter (PM). Particulate matter describes solid particles suspended in air; this includes dust, smoke, and other organic and

inorganic particles. PurpleAir sensors use laser particle counters to count the number of particles by particle sizes 0.3, 0.5, 1, 2.5, 5, and 10 μm , and use the count data to calculate mass concentrations of PM1.0, PM2.5, and PM10.

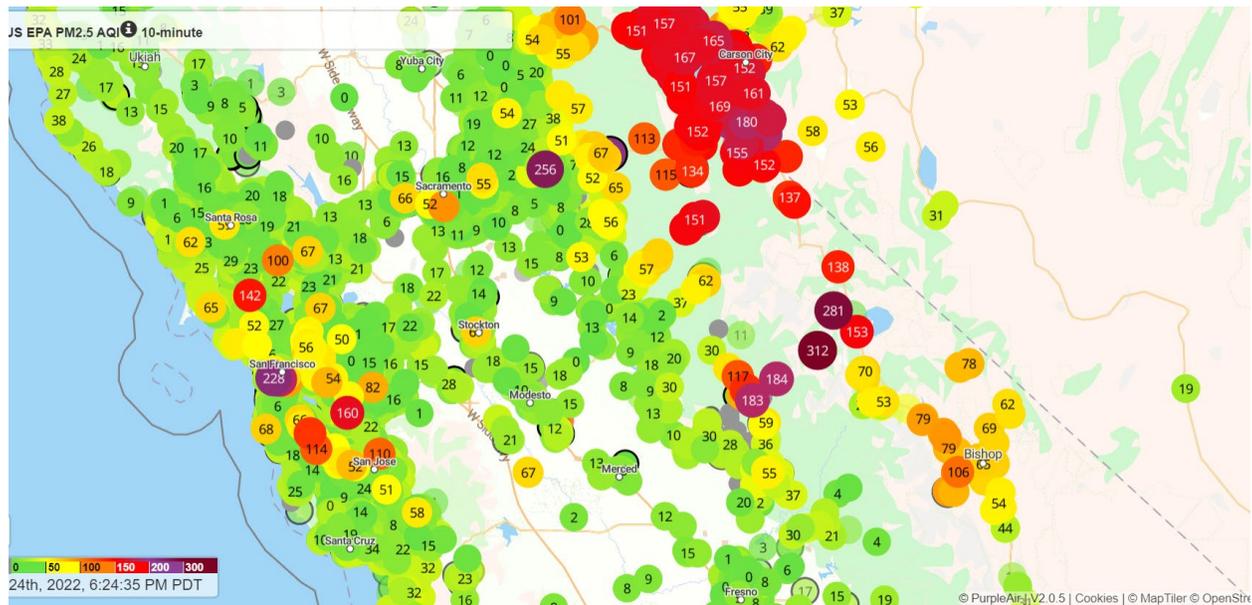


Figure Purple Air from July 24, 2022.

See Mono Lake. Sensors are different.

References:

- 1 <https://fire.airnow.gov/#>
- 2 <https://map.purpleair.com/>

California Academy of Science (San Francisco)

Review by Donald MacLean

This month's science recommendation is the California Academy of Science in San Francisco. Normally I do not push the places that will cost an arm and a leg, but this place is an exception due to its topic diversity and aquarium quality. They do



Mask up! Skeleton of [Tyrannosaurus rex](#) with mask shows that covid has not disappeared.

have free / reduced admission so the bite might be a nibble. The previous and current location is Golden Gate Park in San Francisco, with a 3-year temporary location South of Market Street during 2005 demolition and 2008 reopening period. This latest building was built with sustainability at the forefront. As a person



Tidal Pool.

who has been at the pre 2005 building and use it as a comparison, some things are better, and some are poorer.

The main emphasis is natural history. The building is 4 stories tall with the following main sections. For the description the entrance level will be ground level even though the front entrance requires a flight of stairs.

1. Natural history (Africa Hall, geophysical exhibits, gems and minerals, roof)
2. Planetarium – ground level
3. Rainforest (butterflies)- enter ground level, spiral to 2rd floor take exit elevator to aquarium
4. Aquarium – below ground

Entering requires proof of vaccination, but no mask. Upon entering there is the Tyrannosaurus rex skeleton with Mask. Where to go next?

The entrance has a variety of things to look at. At this level straight on are the tidal pools, and a top level view of the tanks. If you go right, there is the multi-tier rainforest with



Sea Creature Skeletons

event. There are the plants from the rainforest that yield food items like cinnamon, and vanilla. Numerous small cages with small creature like frogs, snakes are also present.



Left: Butterfly on leaf. Right: Familiar food from the rainforest.

Exiting the elevator from the rainforest, or alternatively using the stairs behind the planetarium goes to the basement where the aquarium is located. Cameras do not do well here as the lighting is not uniform and flashing even when allowed yield funky images. There is a big Philippine Sea coral tank and numerous less lit exhibits, including the bioluminescent creatures. The tunnel exhibit is the Amazon River. Big fishes are there.



Left: Arapaima – An Amazon fish. Right: Worldly view of the sand dollar.



Redtail Catfish

Note there is a cafeteria on site that is pricy, but I see people do bring food. You can eat indoors or outdoors.

Entrance Fee: varies, including free days (used to), severe discounts given to Government Assistance Recipients (EBT, WIC, Medi-Cal, and Lifeline Pass cardholders).

Parking: availability varies, free if willing to walk.

Web site: <https://www.calacademy.org/>

Requires proof of vaccination but no mask as of August 2022.

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American Chemical Society Fall 2022 Hybrid Meeting Chicago, Illinois

By Jim Postma with additions from Alex Madonik, Bryan Balazs, and Sushila Kanodia

The Fall 2022 meeting was held in a hybrid format from August 21-25. For those present in person, the weather was mostly sunny but not too hot or humid; had the meeting been held a week later, thunderstorms with flooding and power outages would have been part of the proceedings. As of August 24, there were 11,619 registrations (9,355 in-person and 2,264 virtual).

The last time a National Meeting was held in Chicago was in the spring of 2007 when the logistics of travelling between downtown hotels and the convention center were a major headache. A dedicated (private) access road used only by buses and shuttles is now available, thereby avoiding the traffic congestion on the public roads. While not optimal, the typical shuttle trip this August was about 10 or 15 minutes, compared to the 45 minutes to an hour in 2007.

The ACS Council meeting was also held in a hybrid manner (a first) on August 24; council attendance was about two-thirds in person and one-third virtually. Actions of the Council include elections to the Council Policy Committee, the Committee on Committees, and the Committee on Nominations and Elections. Other items for Council action were touch-ups to committee documents and standing rules.

The Council Policy Committee (CPC) reported that both Council meetings in 2023 will be held in a hybrid manner, very similar to what Councilors experienced in Chicago.

Councilors celebrating milestone anniversaries were acknowledged and thanked for their years of service on Council. This includes Attila Pavlath for 50 years of service.

A feature of the past few Council meetings has been a "Council Special Discussion." This time the topic was "ACS for the Future" about potential initiatives, programs or events that would greatly benefit ACS members or ACS at large. Three specific questions were posed to Councilors for their input and suggestions:

- What can be accomplished to enhance the ACS experience?
- Why (or how) do you think it would make a difference?
- Who would be tasked with leading this effort (e.g. a section, committee, division, or other)?

The Board announced that \$500k of ACS funds were donated to aid Ukrainian chemists and scientists. While not unprecedented, questions of "When does the ACS act?" are not set in policy.

By consent, the Board approved the recommendations from the Committee on Meetings & Expositions of sites and dates for future ACS meetings (Indianapolis and San Francisco in 2023, New Orleans and Denver in 2024, San Diego and Washington, D.C. in 2025, and beyond through 2030, when we'll be back in Chicago.)

Most of the California Section councilors were present at the ACS Fellows ceremony where Jim Postma joined the ranks of ACS Fellows.

The California Section was recognized with one ChemLuminary Award for our Senior Chemists Committee event, organized by Lee Latimer and offered in conjunction with the Huron Valley Section.

Additions from Alex Madonik

Alex Madonik (Councilor) attended the Council Meeting virtually. Alex rotated off the Committee on Community Activities at the end of 2021, and joined Meetings & Expositions this year as an Associate. He has attended virtual meetings of the Committee as well as of the Technical Programming Subcommittee. The latter shapes the details of the technical program (including the number and modality of the technical sessions). While hybrid meetings are inherently more expensive, the ACS Board of Directors has stated their strong support for increasing meeting accessibility via the hybrid modality. Alex is happy to see the ACS take the lead in expanding access to meetings. If you have comments about any technical issues that arose during the Chicago meeting, please pass them along.

The committee is coordinating with YCC (Young Chemist Committee) to do programming on local, regional and national level

Note from Bryan Balazs

1. Council attendance was about two-thirds in person and one-third virtually.
2. Although there were many questions at the meeting about holding the Spring 2023 meeting in Indianapolis due to recent changes in abortion laws in Indiana, this issue did not come up before Council. As of now, the Spring 2023 meeting will continue as planned.

Note from Sushila Kanodia

My comments as a member of Committee on Ethics

The sections are encouraged to have programming on ethics, and self nominate for the chemluminary awards.