

Betsy says HI!!!!

Announcements:

The next LABQUEST meeting will be this Wednesday, June 12 at 12:30 in the GSA trailer. A lot has happened since our last meeting two months ago so this meeting is an opportunity to learn what has happened.

Science Report Highlights

Betsy and Dan thought all the items in following science report from Charles were interesting but most liked the following:

- Crepey Skin
- What *Not* to Do About Knee Issues
- Second Brain Implant to Proceed
- New Biomarker May Allow Early Alzheimer's Disease (AD) Diagnosis Before Symptoms
- How To Wash Pesticides Off Produce
- Choline is an Essential Nutrient
- Is There a Difference Between Brown and White Eggs
- Large Deposit of Hydrogen Gas Discovered

Science Report

Self-Protective Measures -

You should get your medical advice from official sources, your doctor, or your pharmacist ... not from this Report or the internet. Per recommendations by FDA and CDC, everyone should maintain current vaccinations for the three respiratory viruses: Covid, flu and RSV (for RSV, adults [over 60](#) and children [younger than 8 months](#)) - unless your doctor advises against it based on your medical record. Adults over 50 should have had the [Shingrix vaccine for shingles](#) (two doses 2 to 6 months apart, good indefinitely).

- [Crepey Skin](#) - A board-certified dermatologist advises that the condition is primarily the result of skin exposure to the UV in sunlight, with pale skin being more affected - smoking is also a factor. The skin loses volume due to dehydration, leading to a degradation of collagen and elastin because the integrity of the skin is damaged. Sun glasses, wide brimmed hats, protective clothing and sunscreen are preventives, and there are some over-the-counter topicals with ingredients such as retinoids, alpha hydroxy acids, peptides, growth factors, hyaluronic acid and antioxidants that can help to stimulate collagen production - [details](#). No oils.
- [FDA Advice on Sun Exposure Safety](#) - [here](#). Summary: minimum sunscreen SPF of 15, water resistant.
- [What *Not* to Do About Knee Issues](#) - See these [8 don'ts](#) from orthopedic surgeons.
- [CDC Advice on Use/Cleaning/Storage of Contact Lenses](#) - [here](#).
- [CDC Map Showing the States Where Covid is Likely Increasing](#) - [here](#).

- Predominant Strain of Covid in the US is KP.2 (30%) - It's [about as infectious as earlier strains](#), is no more likely to result in hospitalization, and existing vaccines should remain effective against it. [Updated vaccine](#) this Fall.
- Temporary Closure of 5 METRO Red Line Stations - for Purple Line construction. Note [4 shuttle bus lines](#).
- NOAA Weather Prediction for Summer 2024 - [here](#). Summary: "99% chance that 2024 will rank among the five warmest years on record and 55% chance it will be the hottest on record." The grid is closer to being ready with the needed power because of the 25 GW of new solar added since last year. See the problematic regions [here](#).
- Where to Swim in the DMV - [here](#).
- NIH BMI Calculator - Use the [NIH](#) National Heart, Lung and Blood Institute [calculator](#) to find your Body Mass Index (BMI). Above 25 - overweight. Above 30, check with your doctor, consider better nutrition, and exercise.

Vaccine and Therapeutic News -

- FDA Approves World's First mRNA Vaccine *not* for Covid-19 - FDA has approved mRESVIA, an mRNA (messenger ribonucleic acid) vaccine from [Moderna](#) (Cambridge MA) for protection of adults over 60 from lower respiratory tract disease due to the Respiratory Syncytial Virus (RSV). mRESVIA is the only RSV vaccine [available in a pre-filled syringe](#). Availability this Fall.
- Self-Collection of Human Papillomavirus (HPV) Samples - for three types of HPV tests has been approved by FDA, when done in a health care setting - [P160037](#), [P100020](#) and [P190028](#).
- New Research Connects HPV Vaccination With a Reduction in Head/Neck Cancer in Boys and Young Men - HPV accounts for about [70% of head and neck cancers](#) - twice as likely in men.
- First Person to Receive a Transplanted Pig Kidney Has Died - about two months after the operation, at Massachusetts General Hospital where the transplant was done. [Thank you Richard Slayman](#) for your contribution to science. Now a New Jersey woman has received a [second pig kidney transplant](#) at NYU Langone Health, along with a thymus gland from the same pig to help avoid organ rejection.
- Second Brain Implant to Proceed - FDA has cleared ([IDE](#)) Elon Musk's [Neuralink](#) (Fremont CA) to install an implant in a second patient, to be selected soon. [Details](#). The company plans a total of 10 this year. Many of the problems with the first implant have been corrected with software fixes - thanks [Noland Arbaugh](#). The updated version will insert the 64 hair-thin wires a bit deeper to prevent motion displacement. Luck!
- Sauna May Help Treat Depression - A study recently [published](#) by clinical psychologists at UC San Francisco Osher Center for Integrative Health showed positive results. 12 adults with major depressive disorder were treated for eight weeks with a combination of cognitive behavioral therapy and sauna sessions at 101.3° F for 140 minutes. By the end of the trial, 11 out of the 12 participants no longer met the criteria for major depressive disorder. The researchers theorize that the heat of the sauna helps to reset the body's thermoregulatory system. Depressed patients often have [elevated temperatures and a reduced ability to sweat](#). [Bernie A.]
- Male Birth Control Gel - The [preliminary result of the Phase 2b human trial](#) showed that 86% of men reached the necessary low sperm count level in 15 weeks. Side effects were minimal, with no psychological or performance issues, and the [process was reversible](#). The gel is rubbed on each shoulder each morning, and requires about two months to take effect. Phase 3 next.

Other Health Science News -

- [FDA's Reorganization for Establishing Unified Human Foods Program](#) - has been approved in compliance with the [Food Safety Modernization Act](#), and is intended to shift the Agency's focus from *responding* to foodborne illness to *preventing* it. Note the [list of Final Rules](#) established in the process. The reorganization is due to go into effect on October 1, 2024.
- [MRI Machines and Helium](#) - Liquid Helium is required to maintain the superconductive status of the magnet windings of MRI machines, and Helium has become increasingly scarce. Thus the celebration over the discovery of a huge stratum of [Helium bearing rock in northern Minnesota](#). [Pulsar Helium](#) (White Rock, British Columbia, Canada) reported the [concentration was 12.4%](#), about 30 times the standard for commercial helium. Russia and Qatar are presently the major exporters. There's also talk of mining Helium on the Moon (actually).
- [Nuron-Sized Brain Implants for Restoring Vision](#) - The technical barrier has been two-fold: 1) making electrodes small enough to fit a large number on a single implant and, 2) protecting the metal from corrosion. Both problems have recently been [solved in successful mouse experiments](#). The next step is to create an implant that will have connections for thousands of electrodes. This is still a lab experiment. Stay tuned. [Publication](#).
- [New Biomarker May Allow Early Alzheimer's Disease \(AD\) Diagnosis Before Symptoms](#) - Researchers at the Institute for Bioengineering of Catalonia have identified a type of microRNA, [miR-519a-3p](#), the reduction of which in blood samples is associated with early stage AD. If further work bears this out, then the progressive reduction of this microRNA in blood samples could be the much sought after biomarker for pre-symptomatic AD that would advance both AD research and treatment. [Publication](#).
- [Association Between Certain Nutrients and Brain Health](#) - A new [study](#) from researchers at the University of Illinois associated these nutrients with better brain health: several fatty acids including the omega-3 polyunsaturated fatty acids alpha-linolenic acid (ALA) and eicosapentaenoic acid (EPA), the carotenoids lutein and zeaxanthin, vitamin E, and choline. See more details, and a list of the types of natural foods that contain these nutrients, [here](#). Generally, it's the [Mediterranean Diet](#).
- [Disposal of Dangerous Medical Waste in Maryland](#) - After an investigation by the state, Curtis Bay Energy has plead guilty to 40 criminal counts for failing to properly dispose of dangerous medical waste, and was [fined \\$1.7 million](#) in 2023. Curtis Bay has [one third of the US capacity](#) for [burning medical waste](#). The Johns Hopkins Health System and University have announced that they will be diverting their medical waste to environmentally friendly technologies such as autoclave and ozone sterilization.
- [Are Your Stools Healthy?](#) - Check the Bristol Stool Chart [here](#). Ideally you should be a Type 3 or 4. This simple check, that you can routinely do yourself in a few seconds, may help catch a problem early, and could provide important information for your doctor. [Details](#).

Practical Nutrition -

- [How To Wash Pesticides Off Produce](#) - use [tap water](#), not baking soda, white vinegar or specialty 'produce washes', according to a Professor and Director of Dietetics at the University of Georgia (Athens GA). [FDA recommends against](#) [video] using soap, detergent or commercial produce washes, since produce is porous and may absorb them. Choose organic to avoid incorporated pesticides, but wash unless labeled 'prewashed'.
- [There Are No Fresh Shrimp at the Grocery](#) - At the docks in Key West FL or Indian River Inlet DE, yes. Otherwise, [shrimp](#) are frozen shortly after they are caught, delivered to your grocery frozen, and then either bought frozen, or the store thaws them and lays them out at the seafood

counter *looking* fresh. So ... the freshest shrimp available are the ones you buy frozen and cook at home yourself. See a rundown of the 6+ types of shrimp, and variations on how to prepare them, [here](#). [scroll down further for tips on buying salmon] Shrimp are tasty, very nutritious, and frozen is good. [Marlene T., Tom J.]

- Choline is an Essential Nutrient - but is neither a vitamin nor a mineral. Your body makes a little, but not enough. The rest is best made up from natural foods such as: [salmon, cod, eggs, Broccoli, and Cauliflower](#) - do not use supplements without your doctor's advice. Choline is required to make acetylcholine, an important neurotransmitter involved in memory, muscle movement, regulating heartbeat and other basic functions.
- Canned Beans are Healthy - good protein, rich in anti-oxidants and great fiber ... just as healthy as dried beans, but *way* more convenient to prepare. Watch the Sodium, however. You can reduce it a bit, if need be, by pouring off some of the canning liquid before use. Good variety at the store. Try [Heyday Canning](#) 'Enchilada'.
- Health and Other Benefits of Soaking Dry Beans and Chickpeas Before Cooking - [here](#). Summary: improves digestibility, reduces antinutrients.
- Simple, Healthy, High Protein, Whole Food Lunches - See recipes for [30 quick and easy Mediterranean lunches](#) recommended by a registered dietician, [here](#). More protein = less hungry = better for weight maintenance
- Is There a Difference Between Brown and White Eggs? - No, there is [no nutritional or culinary difference](#). The outer shell color depends on which breed of chicken laid the egg. Eggs labeled 'Omega-3' are from hens fed with flaxseed, while those labeled 'free-range' may be more diversely nutritious from eating a variety of food. Eggs are packed with protein, and antioxidants. Dieticians usually suggest an average limit of one daily.
- Misleading Words For Sugar - High-fructose corn syrup, sucrose, barley malt, dextrose, maltose and rice syrup are all [forms of sugar](#).
- Is Your Favorite Food Ultra-Processed? - and if so, what's a good substitute View the Northeastern University [TrueFood Dashboard](#).
- Most Nutritious Vegetables and Fruits Rank-Ordered by CDC - See the list [here](#). Chinese cabbage = bok choy.

Environmental Science News -

- EPA Final Rule on Mercury and Air Toxics Standards (MATS) for Power Plants - [here](#). See a legal/financial analysis on how EPA's flexibility on applying this [final rule](#) to a coal-to-solar/storage project in Minnesota interacts with the US 2022 Inflation Reduction Act, reducing the construction cost of the project from \$1,055,000,000 to \$422,000,000 ... with a further \$350,000,000 in local benefits from payments to landowners and local governments - [details](#). And ... the utility will both stop burning coal, and offer power at lower rates.
- Congress Bans Uranium Imports from Russia - The US Department of Energy is allowed to grant waivers in case of shortages through 2028. The new law also frees up [\\$2.27 billion to increase US production](#). Russia presently supplies about 35% of US imports of nuclear fuel, and controls 44% of world capacity.
- UK to Build Nuclear Fuel Facility to Power New Advanced Modular Reactors - The UK will fund [Urenco](#) to build the first European facility for producing enriched (5-20%) Uranium fuel elements needed to power the coming generation of advanced modular reactors - High-Assay Low-Enriched Uranium ([HALEU](#)). The facility in Cheshire will have the capacity to produce up to 10 tonnes of HALEU annually by 2031, the [energy equivalent of more than one million tons of](#)

[coal](#). Russia is currently the only European supplier of this advanced nuclear fuel. One more Russian energy monopoly broken!

- [Large Deposit of Hydrogen Gas Discovered](#) - Hydrogen is currently obtained by refining it out of natural gas - messy and expensive. A [Hydrogen gas deposit has been discovered in a mine in Albania](#), and more importantly the type of rock that bears it is widely distributed. So now we have a clue about where to look. [Publication](#).
- [Parrots and Cockatoos Use 'Facebook Messenger' to Chat](#) - Researchers at the University of Glasgow School of Computing Science in the UK, and Northeastern University in the US, [theorized](#) that some of the neurotic behaviours seen in captive birds are the result of not receiving the socialization they would naturally have with their flocks in the wild. The birds were trained to [ring a bell when they wanted to request a chat](#) The experiment confirmed the theory, with the birds showing a strong preference for *real time* interactive chats over recordings. [Sarah F.]
- [White Storks Are Back in Portugal](#) - They had been considered endangered, but are now back up to about 20,000 breeding pairs ... [due to garbage dumps and climate change](#) (actually). Previously they migrated to sub-Saharan Africa for the winter, but with plenty of food (garbage), and warmer temperatures (climate change), they are now staying year round. The portuguese grid operator is putting nesting platforms on their grid pylons to facilitate nesting, and the storks have moved right in. So the white storks are climate change *winners*.
- [Portugal Met 95% of its Electrical Needs With Renewable Energy in April!](#) - [details](#).
- [Klamath River Dam Removed](#) - [Demolition work at the California/Oregon border has begun](#) on the Iron Gate Dam, the largest (173 feet tall, 740 feet wide) of the Klamath River dams to be removed to [facilitate salmon migration](#) - two smaller dams will go by September. A fourth smaller dam was removed last year. [Finally](#) done!
- [Chevy Bolt EV Owners Get Compensation for Battery Issues](#) - Many 2017-22 Bolt owners got their batteries replaced in a GM recall to reduce the risk of fire. Now they may be eligible for [cash compensation up to \\$1,400](#).
- [New Toyota Class 8 Heavy Duty Electric Semi](#) - The 'Tern' ([photo](#)) is scheduled to go into production later this year - 68,000 pound capacity, 680 peak horsepower (494 continuous), 200 mile range, 0-80% charge in less than two hours at 240 kW, dual [Hexagon Purus](#) (Oslo Norway) Gen3 269kWh battery packs in 750-volt, 538 kWh configuration. Woof!
- [Is There Life After Diesel-Electric Locomotives?](#) - Moving freight by rail is much more Carbon efficient, pound for pound, than by truck. Can this be further optimized with alternative power sources, or by using less diesel in a two- locomotive '*consist*'? For some years (rail companies are very conservative) Wabtec has been providing the long haul rail industry with battery electric locomotives ([FLXdrive](#)) [specs and [photo](#)] to test, or use in rail yards. Two ideas: 1) Battery Electric, the locomotive is powered by a battery that gets recharged from a stationary [pantograph](#), on a siding or in a rail yard, with a boost from regenerative braking; 2) [Hydrogen Fueled Battery Electric](#), on-board Hydrogen feeds a fuel cell that generates power to recharge the battery, in development with GM and HYDROTEC using the [GM](#) Ultium battery and [HYDROTEC](#) fuel cell. [Phil J.]
- [State and City Limitations on Gas-Powered Lawn Equipment](#) - are gradually taking hold using a variety of approaches, [details](#). These small, single stroke gas engines produce a disproportionate amount of air pollution, and much more noise than electric versions. Washington DC has a strict ban on both sale and use.
- [Safe Containment of Toxic Coal-Burning Power Plant Ash](#) - out of contact with groundwater has been required of *operating* coal plants by the US Environmental Protection Agency (EPA) since a disastrous [2008 infrastructure breach at TVA's Kingston Fossil Plant](#) sent more than a billion

gallons of toxic coal sludge into nearby waterways, and then sickened workers brought in to clean it up - scores of whom have since died. More than 800 million tons from the 'cleanup' were removed to Uniontown Alabama, with an unknown health impact. The [recent EPA Final Rule](#) on the subject will require not only proper ash containment at *active* coal plants, but also at *closed* plants - including TVA plants in Sumner, Anderson, Roane, Hawkins and Humphreys counties in Tennessee. Justice can be expensive.

- [US EPA Denies Alabama's Coal Ash Disposal Plan](#) - which would allow Alabama Power and other utilities to continue storing toxic coal ash in unlined pits at sites across the state. [Map](#) and details [here](#). Still in denial.
- [Neat Total Fish Kill Along 60 Mile Stretch of an Iowa River](#) - [Details](#). Due to an accidental release of fertilizer (valve left open overnight, 1,500 ton spill) into Iowa's the East Nishnabotna and main Nishnabotna Rivers, an estimated [750,000 fish were killed in the Iowa segment](#) of the river, with an estimated 40,000 additional in the stretch of river running through Missouri. The source of the spill was the [NEW Cooperative](#), a farmers' coop.
- [New Grid-Scale Energy Storage Facility Opens in Nevada](#) - Energy Vault and NV Energy have [started commercial operation](#) of the [Reid Gardner Battery Energy Storage System](#) in Moapa, Nevada (50 miles northeast of Las Vegas). Because it is on the site of a decommissioned coal-fired plant (one of the dirtiest in the US), the two-hour, 220 MW/440 MWh grid-tied battery system is already connected to the grid without further expense or delay. The utility expects its customers will see a 15-20% reduction in power costs due to efficiencies gained from the new facility. Win Win!
- [World's First Carbon Neutral Cement Plant](#) - is under construction by [Thyssenkrupp Decarbon Technologies](#) (Lägerdorf Germany) using pure Oxygen to capture for industrial reuse nearly 100% of the CO2 produced - 'Oxyfuel' technology. Cement and concrete production generates as much as [nine percent of all human CO2 emissions worldwide](#).

Other Science News -

- [New Cloud Computing and AI Infrastructure Campus](#) - Microsoft has [announced](#) that it will invest \$33 billion to establish a manufacturing-focused AI co-innovation lab, and AI skilling initiative in Southeast Wisconsin, centered on a newly constructed campus at Mount Pleasant WI - 2 square mile site, operational goal late 2026. The company will also partner with [Gateway Technical College](#) (Kenosha WI) to build a [Data Center Academy for a jobs training program](#), establish a presence on the campus of the University of Wisconsin-Milwaukee, and (with National Grid Renewables) construct a 250 megawatt solar farm scheduled for operations in 2027. The 2021 US Infrastructure Act and the 2022 US Chips and Science Act were credited. Win! Win! Win!
- [US Department of Defense Replicator Program](#) - is designed to field thousands of 'attributable' platforms, including uncrewed surface vehicles (USV) and counter-uncrewed aerial systems (cUAS) for both reconnaissance and strike. The first Replicator system to be [announced](#) by name is an acceleration of the Switchblade-600 [\[photo\]](#) loitering munition, [AeroVironment](#) (Simi Valley CA). Switchblades are already in use in Ukraine. [Sean C.]
- [US Marine Forces Special Operations Command \(MARSOC\) Evaluating Robotic 'Dogs'](#) - developed by [Ghost Robotics](#) (Philadelphia PA), with AI-enabled digital imaging system and an Onyx Systems 'SENTRY' remote weapons system. Good video [here](#), but a bit chilling.
- [US Army Deploys Directed Energy Anti-drone Systems](#) - The Army has deployed two Palletized High Energy Laser ([P-HEL](#)) systems to an undisclosed location abroad, one in 2022 and the other recently - produced by US defense company [BlueHalo](#) (Arlington VA). Reports indicate the

location is in the mid-East. The Army had said it was working on [several directed energy projects](#), with a system reliability and field repair focus

- [Fry Drone Electronics with Intense Microwave Bursts](#) - The US Army has now received [4 prototype microwave drone zappers](#) from [Epirus](#) (Torrance CA), which calls its system Leonidas - its first Indirect Fire Protection Capability-High-Power Microwave prototype, or [IFPC-HPM](#). Greek mythology reference, [here](#).
- [Shot from New UK Drone Killer Cost 13 cents](#) - [Details](#). The 'Radio Frequency Directed Energy Weapon' can find and track multiple targets simultaneously at distances of over 1 km, and fire RF energy pulses to overload and disable a drone's delicate electronic circuits. [Work is continuing to extend its range](#). The shot arrives at the speed of light - Mach 870,000, *beyond* hypersonic.
- [China's Moon Lander Chang'e-6](#) - is back in circum-lunar orbit after having [retrieved the world's first sample](#) of lunar regolith from the far side of the moon ... the trip back to Earth will take about 6 weeks. The moon is tidally locked to the Earth, always showing the same side to Earth, so the far side is never directly visible from Earth.
- [SpaceX's Starship Successfully Completes First Launch and Splashdown](#) - The *uncrewed* 400 foot Starship+booster has been described as the largest and most powerful rocket ever built. Sequence: [Liftoff with 32 of the 33 booster engines firing \(one failed\)](#), booster segment separated and achieved a powered splashdown in the Gulf of Mexico as planned. The Starship itself proceeded to achieve orbit successfully with all 6 engines firing, Starship later makes a [successful reentry and powered splashdown in the Indian Ocean](#) (minus a [few pieces that got ripped off](#) in the process). Success! NASA eventually intends to use the crewed Starship in the Earth/Moon run to the US moonbase.
- [Boeing Starliner's First Crewed Mission Has Reached Orbit](#) - and is on its way to the International Space Station (few Helium leaks not critical) [without incident](#). NASA intends to use the Starliner as a second source for crew and supply runs to the International Space Station. ***UPDATE*** after a few more glitches, Starliner has docked successfully at the ISS!
- [And In a Galaxy Far Far Away](#) - Unexpected, [here](#). [white arrow in red box] [Barbara R.]

Nice Thing -

Norma - Vincenzo Bellini - an opera first performed at La Scala in Milan in 1831.

- [Mira O Norma](#) - a mezzo soprano and soprano duet (in concert) - [here](#), and stay on for one of the world's most famous cocktail parties. [Jenna D.]