

Betsy says HI!!!!

Announcements:

- The next LABQUEST meeting will be Wednesday, March 13 at 12:30 in the trailer.

Science Report Highlights

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

- Weight Loss Drugs
- Excessive Niacin
- Too Much (Avoidable) Sodium from Salt
- 8 Conditions That May Require a Vitamin D Supplement
- New CDC Covid Vaccine Recommendation
- Mother Lode of Rare Earths – found in Wyoming
- Multiple articles on drones in Ukraine

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).

- Weight Loss Drugs - are [not a magic bullet](#), or a durable solution to weight control, because they don't address the root causes of excess weight (or weight distribution, or muscle/fat ratio). Both of the most widely discussed weight control drugs are *prescription only* because they are designed (and approved by FDA) to treat excess weight as a *medical* indication. Durable Solution: sensible nutritional practices along the lines of the [Mediterranean Diet](#) or [Blue Zone](#) approach, and a minimum of 30 minutes of vigorous exercise daily. [Video](#).
- Excessive Niacin - Niacin is the same as Vitamin B3 is the same as nicotinic acid, and is an essential micronutrient. Cleveland Clinic researchers have recently published a [study](#) concluding that *high* levels of niacin are associated with cardiovascular inflammation and heart disease. Read a lay article [here](#). Whole natural foods provide a reasonable amount of Niacin, and a balanced multivitamin will fill in any additional need. Niacin supplements should *not* be used without a doctor's advice. Niacin fortification in food isn't needed.
- Measles in Florida - The Manatee Bay Elementary School in Weston FL (near Fort Lauderdale and Pompano Beach) is [reporting an outbreak of measles](#) that has already spread off-campus. Measles is about 10 times more infectious than Covid or flu, and

can have serious consequences. About [20 percent of infected children are hospitalized](#), 10 percent develop infections that can lead to permanent hearing loss, and up to 3 in 1000 die. [Florida health officials are not following CDC advice](#) on containing the spread of measles. [Video](#) update.

- [Too Much \(Avoidable\) Sodium from Salt](#) - Most Americans take-in way too much salt as Sodium Chloride (NaCl), about 3,500 mg/day, resulting in [too much Sodium](#) [view the informative video]. That can contribute to [uncontrolled high blood pressure](#), which increases the risk of chronic diseases like heart and kidney disease, diabetes and dementia. You can buy **low Sodium salt**, based primarily on Potassium Chloride (KCl, tastes like table salt), but with 70 % less Sodium than table salt, *and* get some useful Potassium. 'Salt' is a generic term for a family of ionic compounds - NaCl, KCl and others. Note: choose the *iodized* form of low Sodium salt at the grocery, and choose low Sodium *products* like low Sodium soy sauce.
- [Dry Ice](#) - is the solid phase of Carbon Dioxide (CO₂). At room temperature it [sublimes](#) directly from its super-cold solid phase into its colorless, odorless, *unbreathable* gaseous phase (CO₂). CO₂ is heavier than air, and will fill-up a poorly ventilated space, [displacing the air from the floor up](#). See how a third grade class in Gallatin TN verified all of this the hard way, [here](#). Third graders are short, even shorter when sitting.
- [8 Conditions That May Require a Vitamin D Supplement](#) - Details [here](#). 22% of adults are deficient, 41% have an insufficiency. Your skin makes some Vitamin D from the UVB in sunlight (less if you use sunscreen, or cosmetics, or have dark skin), but Americans living **North of the latitude of Charlotte NC get zero from the sun in the Winter months**. You should ask your doctor if you need a Vitamin D supplement whenever your blood work is done (best measured in mid-Winter). Results of deficiency: Aging (>50), osteoporosis, neurological diseases, malabsorption disorders, kidney and liver disease, depression, pregnancy issues, rickets. Natural food sources: fatty fish (salmon, mackerel, sardines), egg yolks, mushrooms, fortified milk.
- [No More PFAS for Grease-Proofing Paper Food Packaging!](#) - FDA has [announced](#) that due to a *voluntary* agreement with industry, grease-proofing materials containing per- and polyfluoroalkyl substances (PFAS) are no longer being sold for use in paper and paperboard intended for food packaging in the US - even pizza boxes, popcorn bags. FDA is planning to [monitor the market](#) for compliance. [PFAS](#) is a group of chemicals numbering in the thousands, grouped by EPA as either: [Explicit Structures](#) or [UVCB Chemicals](#). It's complicated.
- [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 -

- [New CDC Covid Vaccine Recommendation](#) - 2/28 news release [here](#). CDC is recommending that those over 65 receive an additional dose of the current Covid vaccine, already recommended for the immunocompromised. CDC: "Adults 65 years and

older are disproportionately impacted by COVID-19, with more than half of COVID-19 hospitalizations during October 2023 to December 2023 occurring in this age group.

- Metastatic Melanoma - FDA has [approved](#) the *first* cellular therapy for unresectable or metastatic melanoma - unresectable means can't be removed by surgery, metastatic means spread to other parts of the body. Over 8,000 people in the US die of melanoma annually. Amtagvi from [lovance](#) Biotherapeutics (San Carlos CA) is a novel T cell immunotherapy (uses patient specific T cells) for patients with limited treatment options. This new approach, using tumor-infiltrating lymphocyte (TIL) cell therapy, will now also be used to explore treatments for other types of cancers. [Publication](#). Yes!
- Metastatic Pancreatic Adenocarcinoma - FDA has [approved Onivyde](#) (with oxaliplatin, fluorouracil, and leucovorin) for first-line treatment of metastatic pancreatic adenocarcinoma. Pancreatic adenocarcinoma is the most common type of pancreatic cancer, with more than 60,000 people diagnosed in the US annually, and nearly 500,000 people globally. [Ipsen](#) Biopharmaceuticals (Paris France). [Details](#). Modest improvement only.
- Medication for Allergic Reaction to Multiple Foods - FDA has [approved](#) the [Genentech](#) (South San Francisco CA) medication [Xolair](#) (omalizumab) for repeated use to reduce the [risk of allergic reactions](#) like anaphylaxis from exposure to multiple foods.
- Brain Implant Allows Thought Control of Computer - by a human *quadraplegic* patient for the first time. The first [Neuralink](#) (Fremont CA) chip was [implanted by robot-assisted surgery this January](#) into a part of the brain that controls motion, after the company received FDA approval to begin a Phase 1 clinical trial in human subjects last May. Those with paralysis due to cervical spinal cord injury or amyotrophic lateral sclerosis (ALS) may qualify for the study. Explanatory [video](#).

Other Health Science News -

- Treatments for Depression - Note: Treatment should be done by qualified healthcare professionals in a clinical setting. See some new and traditional options, [here](#).
- Oral Covid Vaccine Under Development - [Vaxart](#) (South San Francisco CA) has recently [published](#) the animal data that was the basis for its Phase 1 human trial of an oral Covid vaccine just wrapping up. The company is now preparing a Phase 2 trial supported in part by a [\\$9.27 million grant](#) from the US Biomedical Advanced Research and Development Authority (BARDA). The Vaxart vaccine doesn't need to be maintained at ultracold temperatures (< 100° F below zero) for storage, transport and administration, unlike the very delicate mRNA vaccines - you can see the cost and convenience difference, and there's no needle stick. Preliminary results look promising. The company's vaccine candidate is showing both systemic and mucosal antibody production, whereas the mRNA vaccines primarily produce *systemic* antibodies. It's better to stop infection at the point of entry (nose/lungs). Vaxart has also begun a Phase 2 trial for its norovirus vaccine candidate. [John McK., Liz S.]
- Progress on Male Contraceptive - It's non-hormonal, does not affect testosterone or libido, and fertility returns 60 days after stopping the drug. [Results in mice](#) are

promising enough that human trials are being discussed. Nearly half of all pregnancies are unintended. Related background research [here](#).

- Immaculate Conception in North Carolina - [Charlotte the stingray is expected to birth 4 pups](#) in March, even though there is no male stingray in her tank at the Aquarium & Shark Lab in Hendersonville NC. The process is called [parthenogenesis](#), a form of asexual reproduction observed in some animals: fish, birds, insects, and amphibians. Parthenogenesis can also be induced *artificially* in mice, and probably in other mammals. Life!
- BioNTech (Mainz Germany) in Montgomery County Maryland - In 2021 the [company](#) established a manufacturing footprint in the US by [buying an existing 60,000 ft² pharmaceutical manufacturing facility](#) on Clopper Road in Montgomery County MD, with plans to increase the company's cell therapy production and strengthen its US clinical trials supply chain for cancer treatments. The County's original announcement [here](#).
- Toxic Agricultural Chemical Chlormequat - A study commissioned by the [Environmental Working Group](#) discovered Chlormequat in all but one of 13 *non-organic* oat-based cereals (oats, barley and wheat), granola and other products. [Chlormequat has been found to disrupt embryonic growth](#), and produce postnatal adverse effects. See the list of products studied [here](#). One more reason to *choose organic products* at the grocery. Chlormequat may be used on food crops in Canada, but not in the US. Imports *are* allowed.
- 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 -

- New Study Finds Walnuts Help Protect Against Metabolic Syndrome - One in three US adults has [metabolic syndrome](#), defined as having at least 3 of the following conditions: excess midsection fat, high blood glucose levels, high blood pressure, out of range LDL or HDL cholesterol, high triglycerides. Among the usual recommendations are life-style changes, including adopting a healthy nutritional plan. A study [published](#) in January found that [regular consumption of walnuts](#) (polyphenols and beneficial polyunsaturated fats like omega-3s) was associated with a lower risk of metabolic syndrome - lower risk of heart attack, stroke, other cardiological events, and Type 2 diabetes.
- Are Chocolate-Covered Strawberries Healthy? - A registered dietician says yes, in moderation. It should be *dark* chocolate, and additives including sugar should be minimized. [Details](#).
- 6 Antiinflammatory Foods Found at Wegmans - recommended by a registered dietician, [here](#).
- 11 Heart Healthy Snacks - [recommended](#) by a registered dietician who also explains what heart issues they help with, and how they fit into several dietary plans. Plus, you get snacks.

- Some Vegetables Have Good Protein - See a [list](#) of 5. Tune-up: don't put anything fatty on them.
- Health Benefits From Cauliflower - Details/recipes [here](#). Cauliflower is low in: calories, carbohydrates, sugar and fat. There's good: insoluble fiber, antioxidants, Vitamin C, choline, [folate](#) (Vitamin B9), Potassium, [Vitamin K](#). Tune-up: roasted or grilled may be the best cooking methods. Boiling may leach out nutrients. Frozen ok.
- Pineapple - See a registered dietician's [nutritional analysis of pineapple](#), generally very good, and the benefits of the antiinflammatory [bromelain](#) it contains. Note that some medical conditions contraindicate bromelain.
- Make Your Berry Smoothies *Without* Bananas - Bananas are healthy. Berries are also healthy, and have great antioxidants. Eat both berries and bananas, but not mixed together - separate them by a few hours. An August 2023 study has shown that there is a component of the banana that reduces the bioavailability of the antioxidants in the berries by an estimated 84% - ok to mix berries with other antioxidant-rich fruits like pineapple, oranges, mango, raspberries, blackberries, apples, green or black tea (frozen fruit and yogurt also ok). Details [here](#). See a lay description of the research done at UC Davis [here](#) [good diagram]. [Publication](#). Antioxidants are important!
- 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 Announces \$5.8 Billion in Grants for Drinking Water, Sewer and Stormwater Infrastructure - Of this total from the 2021 US Infrastructure Investment and Jobs Act (aka Bipartisan Infrastructure Law), \$3.2 billion will be for drinking water projects (lead pipes, PFAS removal), and \$2.6 billion for storm water and sewer projects. See the preliminary funding allocation for drinking water by state, [here](#).
- EPA Announces \$1 Billion to Start New Clean-up Projects at 100 Superfund Sites - Under the 2021 US Infrastructure Investment and Jobs Act, the Agency is funding *all* the construction work that is ready to begin at Superfund sites nationwide - new work at 25 sites, continuing work at 85 sites, [15 states](#). Serious progress!
- Plugging Abandoned Oil Wells in Texas - The US Department of the Interior has [announced](#) an \$80 million grant, to be administered by the Texas Railroad Commission, for plugging abandoned oil wells. The funds will come from the 2001 US Infrastructure Investment and Jobs Act.
- Coal's Toxic Footprint - Shutting down a coal-fired power plant may be the end of its air pollution, but can be just the beginning of a decades-long recovery from the impact of poisoned soil and water on both the environment and human health. Chile has a plan to close 28 coal power plants by 2040, in addition to the 9 already closed, and the

companies want to simply walk away. See a description of the job ahead of the small beach town of Mejillones in northern Chile, [here](#). [Sarah F.]

- [Florida Ecosystem Challenge](#) - Seagrass is critical habitat for conch, lobster, grouper, shrimp, other food fish, and manatees. It also protects against storm erosion, but it is dying out in certain areas - more than half gone in the last 50 years. The cause isn't a mystery. [Nutrient pollution](#) (Nitrogen and Phosphorus) causes microalgae blooms that prevent sunlight from reaching the grasses. There are multiple sources for nutrient pollution, but one source is leakage from the surprising number of septic tanks still in use. [Miami-Dade County has made a start on that](#), but needs to accelerate. Other coastal Florida cities need to follow suit. There are parallel issues with unprocessed agricultural run-off, and *incompletely* processed city sewage. [Bette Anne S., Gerry C.]
- [Big Copper Deposits Discovered in Zambia](#) - [KoBold Metals](#) (Berkeley California) has been [test drilling in Northern Zambia](#) for about a year, and has announced discovery of [one of the world's largest copper deposits](#). The scarcity and cost of Copper has been a limiting factor for sustainable energy.
- [Mining the Great Salt Lake for Lithium](#) - [Background](#). [Lilac Solutions](#) (Oakland CA) has [raised \\$145 million](#) for this project. They propose to take billions of gallons of water from the lake, extract the Lithium using ion exchange technology, and **return the water to the lake**. Thousands of gallons of water per minute would be processed, producing 20,000 tons of Lithium annually without using the usual evaporation ponds and [without environmental damage](#). A win win!
- [Mother Lode of Rare Earths](#) - has been discovered on a large site to be called the Cowboy State Mine near Wheatland, Wyoming by [American Rare Earths](#) (Sidney NSW Australia). The projected 2.35 billion tons of rare earths is said to be one of the largest finds in the world. Scarce [Neodymium and Praseodymium](#) have been [reported](#). Rare earth semimetals are essential for manufacturing the magnets used in electric motors for EVs.
- [Geologic Hydrogen](#) - The US Department of Energy (DOE), acting through the Advanced Research Projects Agency - Energy ([ARPA-E](#)), has [announced](#) 16 grants totaling \$20 million to universities, national labs, and businesses for early-stage research and development to advance the discovery, production and use of [subsurface Hydrogen](#). This is the first time DOE has competitively selected teams to research this kind of technology. The two research topics are: 1) Production of Geologic Hydrogen Through Stimulated Mineralogical Processes, 2) Subsurface Engineering for Hydrogen Reservoir Management. [Project descriptions](#). A fine start. "There are more things in heaven and earth than are dreamt of in (our) philosophy" - *Hamlet*, Shakespeare.
- [Exploring for Geologic Hydrogen](#) - [Koloma](#) (Denver CO) has raised about a [quarter of a billion dollars](#) for this work, and has now received a \$900,000 grant from DOE (see above bullet). Koloma has already started explorations in the US Midwest. The background geology is [serpentinisation](#), a process that continuously regenerates a supply of underground hydrogen, sometimes called white or gold hydrogen. During this process, subterranean iron- and magnesium-based minerals break down in water to produce hydrogen-rich fluids that can be extracted. It may also be possible to **stimulate** this geologic process. *Drill baby drill*, but not for oil.

- Clean Hydrogen in Florida - The utility company Florida Power and Light (FPL) has announced that its [Cavendish NextGen Hydrogen Hub](#) [map] at the Okeechobee Clean Energy Center has reached an important benchmark - first Hydrogen! FPL expects to reach [full production capacity for this solar powered electrolysis plant this year](#) using two of Florida's most abundant natural resources, water and sun. The solar energy will be stored as Hydrogen until the grid needs power.
- Riverbed Microbiome Shows Unexpected Resilience - In a recently published [study](#), riverbed microbiota held up surprisingly well when exposed to an influx of human wastewater. [Details](#).
- Connie the Junkyard Dog - was [rescued from a shipping container](#) by the Coast Guard at the port of Houston - just before the container would have been shipped overseas. Now named Connie, she had apparently been living in the junked car being shipped out, and had been trapped in the shipping container for more than a week without food and water. Timely barking alerted the Coast Guard - she wouldn't have survived the trip. [Mike C.]
- Less Carbon Intensive Wind Energy - The largest single source of equivalent CO2 emissions from wind turbines is from the steel used in their construction. Siemens Gamesa's GreenerTower uses a variety of techniques to lower the Carbon content of the steel used in the company's wind installations. Details [here](#). The Carbon footprint of wind is [99% less than coal, 98% less than natural gas, and 75% less than solar](#). Now maybe less.
- World's Largest Floating Solar Farm - floats on the surface of a drinking water reservoir in Singapore - 122,000 solar panels, 111 acres (45 football fields), in service 2 years, power for 16,000 homes, eliminates 35,000 tons of air pollution annually (equivalent to taking 7,000 cars off the road), 15% more efficient from water cooling. Details and video, [here](#). [Greg K]
- Tidal Kites - are now providing power to the grid in the [Faroe Islands](#) (Denmark). Each of the [Minesto](#) (Anglesea, UK) Dragon-12 underwater kites weighs 28 tons, is 39 feet long, has turbines onboard, and is rated to produce a maximum of 1.2 MW - power for 1,000 homes - details and photo [here](#). The Dragons are tethered to the bottom, and weave the classic figure eight pattern of a kite in the tidal currents - keeps water flowing past its turbines. Good video [here](#).
- Shared Solar Advances in VA - A [shared solar](#) bill has cleared a key panel in the VA House of Delegates. It would expand Dominion Power's small current program (fully subscribed), and would add a similar program for Allegheny Power's service area in SW Virginia. Progress, maybe.
- 4 States With Recently Expanded Community Solar Programs - Summary: New Jersey, Minnesota, Oregon and New Mexico. [Details](#).

Other Science News -

- Demining Ukraine - The [Halo Trust](#) (Hazardous Area Life-support Organization) is a humanitarian [organization](#) working on training civilians to safely remove mines, and is presently focused on Ukraine. Details/video [here](#).

- New Ukrainian Jet-Powered Kamikaze Drone - about 10 feet long, delta winged, probably uses an off-the-shelf \$10,000 P400-PRO German hobbyist jet engine (8 pounds, 6 diameter, 95 pound thrust). Photo and details, [here](#). The jet version would be substantially faster than the prop-driven version, but with a shorter range. It's made of wood, with some carbon fiber parts and a fiberglass skin. Quite a deadly hobby.
- Ukraine Plans to Manufacture More Than 1 Million Drones in 2024 - [Details](#).
- Canada Donates Drones to Ukraine - The Canadian Minister of National Defense has [announced](#) that Canada will give Ukraine more than 800 advanced SkyRanger R70 multi-mission drones suitable for day or night surveillance and intelligence gathering, and for transporting/delivering supplies - \$95 million. Photo/Specs, [here](#).
- Russian A-50M/U Surveillance and Battle Management Planes - are slow four-engine Ilyushin Il-76 airlifter jets with radar radomes, and stations for up to 15 crew and senior battle-managers. [They had 9 ... now 7](#), and a gap in their surveillance net along Russia's border with Ukraine. The rumor is that the Ukrainian engineers have been renovating/updating [Soviet era S-200s](#) for special [projects](#) Very clever work! [Update 2/29](#).
- Abrams M-1 Tanks Have Arrived - The 31 M-1A1 tanks given to Ukraine by the US are reported to be in action with the 47th Mechanized Brigade [in eastern Ukraine north of Stepove](#) - Tungsten armor, side-mounted M-19 reactive armor blocks, 120-millimeter smoothbore gun and day-night optics.
- First Earth-Sized Habitable-Zone World - has been discovered by NASA's Transiting Exoplanet Survey Satellite ([TESS](#)), and confirmed by NASA's [Spitzer Space Telescope](#).
- World's First Private Sector Moon Landing - [Intuitive Machines](#) (Houston TX) has softlanded its moon lander Odysseus at the moon's South pole. [Details](#). [Update1](#). [Update2](#). They learned a lot.
- 'Synthetic Biology' Achievements ... and Works in Progress -
 - Firefly™ Petunias - Scientists had previously created plants that have bioluminescent properties by using gene-editing to insert the appropriate genes from mushrooms. The synthetic biology start-up company [Light Bio](#) (Ketchum ID), partnering with [Ginko Bioworks](#) (Boston MA), is now commercially producing gene-engineered petunias with up to 100 times more light generating capacity. The company will be placing them [on the market this Spring](#), now that they have USDA approval. In principle, animals could also be gene-engineered to give off light. [Publication](#). Thanks to USDA for the flexibility to recognize innovation.
 - Natural Food Colors - in the yellow to purple range can now be [produced from gene-engineered yeast](#), and can offer a healthy replacement for some of the *synthetic* food colors presently in use - full color palette to come. FDA approval will be needed for use in food. [Phytolon](#) (Yokne'am Illit Israel) partnered with [Ginko Bioworks](#) (Boston MA).
 - Next Generation Vaccine Adjuvants - Adjuvants are materials paired with vaccines to activate the immune system's sensitivity to the more targeted vaccine itself, increasing the effectiveness of the vaccine and allowing the use of a lower dose. The US Defense Threat Reduction Agency's Joint Science and

Technology Office for Chemical and Biological Defense has awarded [Ginkgo Bioworks](#) (Boston MA) and [SaponiQx](#) (Lexington MA) a 5-year, \$31 million contract to discover and develop next-generation vaccine adjuvants. Success would mean that existing, FDA-approved vaccines could be made more effective without being redesigned.

Nice Thing - [skip ads, full screen]

Two Adagios:

- *Adagio for Strings* - Samuel Barber 1938 - [here](#). Very sad.
- *Adagio in G Minor* - Tomaso Albinoni (arranged by Remo Giazotto) - used here as the musical setting for the words of the Ave Verum, sung by a boys' choir, [here](#). Creative videography, very beautiful.