Ode to Happiness for Sunday February 14 2021

What the 2021 Year of the Ox Has In Store for You

Keep your head down, and "avoid too much news."

stellastarwoman.com

By Samantha Vincenty for OprahMag

February 12, 2021 is the Lunar New Year, per the lunisolar calendars traditional in many Asian countries including China, Vietnam, and South Korea. The holiday of new beginnings, reunion dinners with loved ones, and Spring Festival celebrations in China also introduces the Year of the Metal Ox, marking the end of the Year of the Metal Rat. Those with an interest in Chinese zodiac animals may already know that some 2020 Rat predictions were just as unfortunate as the year turned out to be, and now, a new question looms: Will this Year of the Ox be lucky?

That can depend on a variety of individual factors. The compatibility of your personality with the traits of the Ox is affected by your own zodiac animal, according to Susan Levitt, professional astrologer, feng shui consultant, and author of Taoist Astrology. 2021 is also impacted by the fact that it's a metal year (metal is one of the five

elements of the Chinese zodiac; more on this later). Also, you may want to nail down what "lucky" means to you.

"What is the goal, what are you trying to do?" Levitt says. "And, does the energy of the Ox match with your personality or your energy?"

Still, the Year of the Ox will impact us all in a few generally similar ways, according to both Levitt and Pocket Chinese Almanac authors and translators Joanna C. Lee and Ken Smith. Here's what they have to say about the meaning of the Year of the Ox, and a few predictions for what it has in store.

Keep your head down in the Year of the Ox.

While Levitt is an astrologer and student of feng shui, Lee and Smith get their almanac predictions from a Hong Kong-based geomancer named Warwick Wong. Long practiced in his family, Wong's style of Chinese geomancy is a form of divination, or forecasting the future, that observes astronomical movements and what Smith describes as "other atmospheric conditions." Wong then interprets how these impact our lives down on earth, and his daily readings offer what's lucky or unlucky to undertake (February 12 will be good for engagements or starting a business, but bad for rituals and paying out money). But Wong also gives Lee and Smith a general trajectory for what a given year will be like.

Basically, Lee says, "it's a holding pattern." Keep calm and carry on as best you can in 2021, but hold off on major moves if you're able. And in a note worth taking whether you believe in the zodiac or not, Lee relays that Wong says to "try not to be obsessive about following the news, because so much information is in the air." Essentially, preserve your energy and your spirit.

Even to a skeptic, some of Wong's past predictions have felt eerily prescient. On the night before last year's Lunar New Year Eve—January 23, 2020—New York City's Museum of Chinese in America (MOCA) welcomed Lee and Smith for their annual talk on what the Metal Rat year would bring. MOCA president Nancy Yao Maasbach told OprahMag.com the prognosis was that "by consensus, it was going to be a horrible year." Lee and Smith told the audience that Wong had two pieces of advice to share: Don't be argumentative and try to change anyone's minds on matters, and find a safe place, and hide.

Given that the novel coronavirus had gripped Wuhan, China by late January, Maasbach realized that plenty of people in the Chinese-American community were already casting a concerned eye toward how both the lunar year and Gregorian calendar year would pan out in 2020. So she remembers shaking their words off. "I am not superstitious, though I was growing up," Maasbach says. "I'm a God-fearing Christian woman, though it is such a Chinese thing that's in the back of my mind."

After the talk, Maasbach joined Lee and Smith for dinner three blocks from the museum. Barely an hour later, "Nancy got a phone call, and we just lost her," Smith remembers. "She's saying, 'oh my god! Oh my god!' and she ran out."

“I threw the dinner money on the table and ran down the street in 3-inch heels,” Maasbach recounts.

The Museum of the Chinese in America had been destroyed in a five-alarm fire.

Is the Ox compatible with your zodiac animal?

How you'll feel about this steadfast Year of the Ox depends on how you relate to the Ox energy, Levitt says. "Hard work, duty, discipline—that’s the ox,” she says. Levitt says the theme of 2021's lunar year will be "build, build, build," following through on whatever projects you began in the Rat year. Stick to routines, and shy away from wild new methods and ideas.

"I'm happy to be solid and stable, plow the field and work diligently," says Levitt, who was born in the Year of the Sheep. "If you're a horse or a monkey, this isn't your kind of energy. Or if you're a tiger, you want to pounce on the new." Read Levitt's Year of the Metal Ox forecast for each zodiac animal on her website.

If you were born in the Year of the Ox, know that some Chinese superstition holds that it's not a lucky year for you. According to Lee, "It might not be the worst year, but it’s not the best." Though Smith adds, "Good things can happen with twice the intensity, and bad things will happen to you with twice the intensity as well." To attract good fortune, they recommend wearing red, traditionally considered a lucky color in China, keep a plant in your room, and try to maintain a positive mindset.

Here's what the metal element means.

"2021 is a metal year of the five Taoist elements fire, earth, metal, water, and wood," Levitt writes in her guide. "In feng shui, the metal environment is clean, pristine, pared down, and shiny like metal." If you want to best prepare your home for the Year of the Metal Ox, she adds, "begin by cleaning your home, reduce clutter, and maintain tidiness all year round. The main focus is on the bedroom as hard-working oxen do best after peaceful sleep."

The Astrology of 2021 in Review

Notably, in traditional Chinese medicine, the metal element rules the lungs—a body part that's been particularly vulnerable during the COVID-19 pandemic that rose in the Year of the Metal Rat. As such, Levitt says she'd advised clients to take care of their lungs when making her 2020 predictions back in 2019, and recommends quitting smoking if this year if you partake. "The big change for COVID will be on the new Moon in Leo that begins Fire Monkey lunar month on August 8," she writes on her site.

Get excited for the Year of the Tiger in 2022.

Blob:https://www.oprahmag.com/0d03b21c-4c10-4dec-b762-3aa67f003969

Overall, there's no bad news for the Year of the Ox. It's more like...less than exciting news, given that Levitt and Wong both see it as a time to take care of yourself and stay drama-free. But know that 2022's Year of the Tiger may bear out predictions of a new roaring '20s on the way.

"Tiger year is time to leap into the new," Levitt says. Until then, avoid impulsively pouncing on anything.

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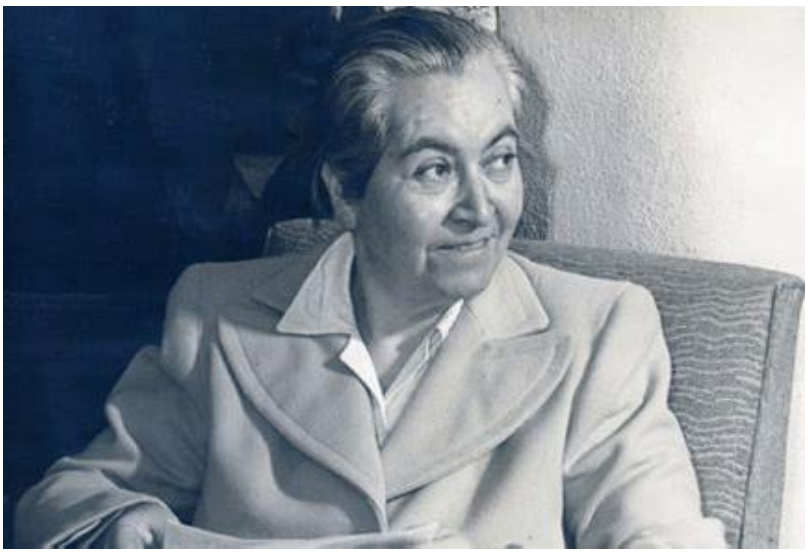
Gabriela Mistral (1897-1967)



Gabriela Mistral was the pseudonym of Lucila Godoy Alcayaga, a Chilean poet, educator, diplomat, and feminist who was the first Latin American to win the Nobel Prize in Literature, in 1945.

The pen name Gabriela Mistral - taken from the French poet Frédéric Mistral and the Italian writer Gabriele d'Annunzio - was used only for her poetry.

In 1921 Mistral became the principal of Santiago High School, Chile's most prestigious secondary school for girls.

In 1930 Mistral was a visiting professor at Barnard College, New York City, and Vassar College, Poughkeepsie, New York.

In 1933 she entered the Chilean Foreign Service and was appointed by the Chilean government as a kind of ambassador-at-large for Latin American Culture.

Later Mistral represented Chile as honorary consul in Brazil, Spain, Portugal and the U.S.

Before and after the war Mistral was associated with a number of American universities. She also served as the Chilean consul in Los Angeles and in Italy.

Mistral's reputation as a poet was established when she won the Chilean prize for \Sonetos de la Muerte\(Sonnets of Death), love poems in memory of the dead in 1914. Much of her poetry is simple and direct in language, but full of warmth and emotion. The main themes in her poems are love, maternal love, sterility, nature, sorrow and recovery. Her lover, Romelio Ureta's suicide in 1909, left deep marks on her writings. Several of Mistral's early poems were written for him.

In 1922 she published her second collection of poems under the title \Desolacion\, which gained an immediate international acclaim. Its main themes were Christian faith and death - she promises that, after death "sunny land" will emerge from decay. In the final sonnet she expresses faith in a forgiving God. Many of the poems in \Ternura\ (1924) deal with childhood.

Poems:

Tiny Feet

A child's tiny feet,
Blue, blue with cold,
How can they see and not protect you?
Oh, my God!

Tiny wounded feet,
Bruised all over by pebbles,
Abused by snow and soil!

Man, being blind, ignores
that where you step, you leave
A blossom of bright light,
that where you have placed
your bleeding little soles
a redolent tuberose grows.

Since, however, you walk
through the streets so straight,
you are courageous, without fault.

Child's tiny feet,
Two suffering little gems,
How can the people pass, unseeing.

I am Not Alone

The night, it is deserted
from the mountains to the sea.
But I, the one who rocks you,
I am not alone!

The sky, it is deserted
for the moon falls to the sea.
But I, the one who holds you,
I am not alone !

The world, it is deserted.
All flesh is sad you see.
But I, the one who hugs you,
I am not alone!

Death Sonnet I

From the icy niche where men placed you
I lower your body to the sunny, poor earth.
They didn't know I too must sleep in it
and dream on the same pillow.

I place you in the sunny ground, with a
mother's sweet care for her napping child,
and the earth will be a soft cradle
when it receives your hurt childlike body.

I scatter bits of earth and rose dust,
and in the moon's airy and blue powder
what is left of you is a prisoner.

I leave singing my lovely revenge.
No hand will reach into the obscure depth
to argue with me over your handful of bones.

To See Him Again

Never, never again?
Not on nights filled with quivering stars,
or during dawn's maiden brightness
or afternoons of sacrifice?

Or at the edge of a pale path
that encircles the farmlands,
or upon the rim of a trembling fountain,
whitened by a shimmering moon?

Or beneath the forest's
luxuriant, raveled tresses
where, calling his name,
I was overtaken by the night?
Not in the grotto that returns
the echo of my cry?

Oh no. To see him again —
it would not matter where —
in heaven's deadwater
or inside the boiling vortex,
under serene moons or in bloodless fright!

To be with him…
every springtime and winter,
united in one anguished knot
around his bloody neck!

The Lark

You said that you loved the lark more than any other bird because of its straight flight toward the sun. That is how I wanted our flight to be.

Albatrosses fly over the sea, intoxicated by salt and iodine. They are like unfettered waves playing in the air, but they do not lose touch with the other waves.

Storks make long journeys; they cast shadows over the Earth's face. But like albatrosses, they fly horizontally, resting in the hills.

Only the lark leaps out of ruts like a live dart, and rises, swallowed by the heavens. Then the sky feels as though the Earth itself has risen. Heavy jungles below do not answer the lark. Mountains crucified over the flatlands do not answer.

But a winged arrow quickly shoots ahead, and it sings between the sun and the Earth. One does not know if the bird has come down from the sun or risen from the Earth. It exists between the two, like a flame. When it has serenaded the skies with its abundance, the exhausted lark lands in the wheatfield.

You, Francis, wanted us to achieve that vertical flight, without a zigzag, in order to arrive at that haven where we could rest in the light.

You wanted the morning air filled with arrows, with a multitude of carefree larks. Francis, with each morning song, you imagined that a net of golden larks floated between the Earth and the sky.

We are burdened, Francis. We cherish our lukewarm rut: our habits. We exalt ourselves in glory just as the towering grass aspires. The loftiest blade does not reach beyond the high pines.

Only when we die do we achieve that vertical flight! Never again, held back by earthly ruts, will our bodies inhibit our souls.

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Be My Valentine?

Uruguay Minerals / Instagram

Miners at the border of Uruguay and Brazil cracked open a rock to find a gorgeous heart-shaped geode inside.

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Chelsea Trotti's Video, *The Box.* Makes Grandpop Swell with Pride

Chelsea Trotti seen here in a rare moment cooling her heels.

This—The Box--is Chelsea Trotti's enrollment submission to USC and NYU. In it a pair of siblings search for a missing box left to them by their grandfather, only to rediscover something much more valuable.

Chelsea, along with several friends, is active in high school and local drama activities as an actor, writer, director, and producer. Notice also the original music by her friend, Mia Ruhman.

The Box: https://youtu.be/zeoWzq3vtn8

Go Chelsea!

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Fat Tuesday's Almost Here -- February 16.

Mardi Gras words from Bill Warner

No Mardi Gras parades or street carnival in New Orleans this year, though.

Nevertheless, I'm planning to bake a king cake (see above) and maybe down a sazerac or two. And listen to plenty of New Orleans funk and jazz. So here's a few Carnival classics if you need 'em.

Professor Longhair's "Go To the Mardi Gras" is sometimes published as "Mardi Gras in New Orleans."

The video of the Wild Tchoupitoulas (pronounced Chop It Toolas) is from the 1970s, I think. Worth watching because the Neville Brothers are their backup band (the subtitled lyrics are a trip, too).

Every rock band in the western hemisphere has probably recorded "Iko Iko," and there are many great renditions. I believe it was originally done by the Dixie Cups, though, and for my money they're hard to beat (especially with the Nevilles, again, as backup).

"Big Chief" is actually another Professor Longhair composition, but I've always loved this rendition by Allen Toussaint (I'm a Toussaint fan all the way, so I had to throw it in.)

As for Dr. John, he was a true master of jazz keyboard styles. You don't hear a lot of that in this number, but it don't get more hardcore voodoo.

https://www.youtube.com/watch?v=0wAMr3V5lN4

https://www.youtube.com/watch?v=498LZARXzN0

https://www.youtube.com/watch?v=EJ4ECThZ_2o

https://www.youtube.com/watch?v=NKhE8YNU4cQ&t=45s

https://www.youtube.com/watch?v=GzHUP3fVN0Y

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Food Fit for Lord and Lady Misrule

King Cake Just in Time for Mardi Gras

Bill Warner's wife, Ellen, showing off the pièce de résistance.

A king cake is a cake associated in many countries with Epiphany. Its form and ingredients are variable, but in most cases a fève (lit. 'fava bean') such as a figurine is hidden inside. After the cake is cut, whoever gets the fève wins a prize. Modern fèves can be made out of other materials, and can represent various objects and people.

In the Southeastern region of the United States, particularly Louisiana and the Mississippi Gulf Coast, king cake is associated with Mardi Gras and is served during Carnival and year round. It may have been introduced by Basque settlers in 1718, or by the French in 1870.

It comes in a number of styles. The most simple, said to be the most traditional, is a ring of twisted cinnamon roll-style dough. It may be topped with icing or sugar, which may be colored to show the traditional Mardi Gras colors of purple for justice, green for faith, and gold for power.

Cakes may also be filled with cream cheese, praline, cinnamon, or strawberry. The "Zulu King Cake" has chocolate icing with a coconut filling.

Traditionally, a small porcelain baby, symbolizing Jesus, is hidden in the king cake and is a way for residents of New Orleans to celebrate their Christian faith. The baby

symbolizes luck and prosperity to whoever finds it. That person is also responsible for purchasing next year's cake or hosting the next Mardi Gras party. Bakers have recently been placing the baby outside of the cake to avoid liability for any choking hazard.

The Twelfth Cake, Twelfth-night cake, or Twelfth-tide cake was once popular in the United Kingdom on Twelfth Night. It was frequently baked with a bean hidden in one side and a pea hidden in the other; the man/lord finding the bean became King for the night, while the woman/lady finding the pea became the Queen - also known as the Lord or Lady of Misrule. Earlier, in the time of Shakespeare, there was only a Lord of Misrule, chosen by the hidden bean, reflected in Shakespeare's play Twelfth Night.

Bill Warner's 'Official' King Cake Recipe

This recipe comes pretty much straight out of The Encyclopedia of Cajun & Creole Cuisine, by John Folse. King cakes are traditional fare for the Louisiana Mardi Gras season, beginning each year with Twelfth Night. The custom is to bake or hide a small object, or "baby," in each cake. Whoever gets the slice with the "baby" is then obliged to throw the next Mardi Gras party.

(Note: For the Final Touches, you can easily halve the ingredients for the glaze, unless you want it really thick and sweet.)

For the Dough

½ ounce instant yeast
1½ cups warm water
½ cup sugar
5 cups flour
½ cup dry milk powder
2 tsps. salt
2 eggs, beaten
1 cup melted butter or vegan butter

Dough Preparation

- Combine the yeast with ½ cup of warm water and let it react.
- Sift all dry ingredients together in a mixing bowl and then blend with a dough hook for 3 minutes on medium speed (you might have to ease the dry stuff away from the sides with a spoon now and then).
- In another bowl, combine the eggs with ¾ cup of melted butter and the rest of the water. Then add this, along with the blossomed yeast, to the dry ingredients, slowly increasing the speed of the dough hook.
- Keep the dough hook running steady for another 10 minutes or so, or until the dough gains consistency and pulls away from the bowl (you can add another ½ cup of flour if it's not firming up in a timely manner).
- Brush a stainless steel or glass bowl with melted butter and set the ball of dough in it.

- Brush the dough with more melted butter. Cover the bowl with plastic wrap, set it in a warm spot and let the dough rise. It should double in size. (This can vary with elevation, temperature and humidity. We let ours rise for two hours, just perfect for a nap.)

Ingredients for Cooking

¼ cup melted butter
½ cup sugar
1 Tbsp. cinnamon
Egg wash (½ cup milk and 2 egg beaten)

Cooking the Dough

1. Warm the oven to 350 degrees.
2. After the dough has risen, roll it out, using a rolling pin, on a well-floured surface to make a rectangle with dimensions of 12 inches by 18 inches.
3. Brush the flattened dough with the melted butter and sprinkle with the sugar and cinnamon.
4. Cut lengthwise into three equal sections, then pinch the ends together at one end and braid.
5. Form the braid into a circle, or oval shape and place it on baking parchment on a cooking sheet.
6. Brush the cake with the egg wash and let it rise again until it has doubled in size.
7. Bake for about 25 minutes or until golden brown.

Ingredients for Final Touches

2 pounds powdered sugar
1 pinch of salt
1 Tbsp. almond extract
¾ cup water
3 Tbsp. cinnamon
Purple, green and gold sugar
Optional: one king cake baby or baby substitute

Final Touches

1. Use an electric mixer, if possible, to combine sugar and salt. Then slowly add the almond extract and water. Add the cinnamon and blend until smooth.
(Baby option: If you're going to add a baby to the cake, this would be the time. Make a small cut somewhere on the side, going as deep as the center, and push the baby in with a chopstick or something. Be sure to let your guests know it's

somewhere in there, though, so no one winds up having to execute a fast Heimlich maneuver.1)

2. Drizzle the glaze over the baked cake, enough to have an even coating.
3. Sprinkle on alternating bands or patches of the colored sugars.

Heimlich Maneuver

- Wrap your arms around the choking person's waist. Bend him slightly forward at his waist.
- Make a fist with one of your hands. Place the thumb side of your fist between the person's belly button and the lowest part of his ribs. Do not put your fist on the ribs.
- Put your other hand over your fist. Press your fist into the person's abdomen with a quick inward and upward thrust. Repeat the quick thrusts until the object comes out. If the person vomits, lay him on his side to prevent the object from totally blocking his airway.

Unless you are really experienced at this, have someone call 911 right away

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Who Else But Victor Borge?

I won't tell you what's here. Does it matter? Not in the least. You know it's top notch fun.

https://www.youtube.com/watch?v=dKeqaDSjy98

https://www.youtube.com/watch?v=jDI1XkempTo

https://www.youtube.com/watch?v=ei9VVDNxCc8

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Four Days from Now is Perseverance's Rendezvous with Destiny

Mars 2020's Perseverance rover is equipped with a lander vision system based on terrain-relative navigation, an advanced method of autonomously comparing real-time images to

preloaded maps that determine the rover's position relative to hazards in the landing area. Divert guidance algorithms and software can then direct the rover around those obstacles if needed.
Credit: NASA/JPL-Caltech

[Allow me a preamble here: In historical perspective, there's a better than even chance Perseverance won't survive its landing, so suppose it crashes…what then?

Many will be tempted to point to the waste of money, but of the several hundreds of millions of dollars involved in the program, the only true loss will be an agglomeration of metal, plastic, and silicon. What remains of the rest of that investment will be the basis for new and greater achievements in science and technology.]

How two new technologies will help Perseverance, NASA's most sophisticated rover yet, touch down onto the surface of Mars this month.

After a nearly seven-month journey to Mars, NASA's Perseverance rover is slated to land at the Red Planet's Jezero Crater Feb. 18, 2021, a rugged expanse chosen for its scientific research and sample collection possibilities.

But the very features that make the site fascinating to scientists also make it a relatively dangerous place to land – a challenge that has motivated rigorous testing here on Earth for the lander vision system (LVS) that the rover will count on to safely touch down.

"Jezero is 28 miles wide, but within that expanse there are a lot of potential hazards the rover could encounter: hills, rock fields, dunes, the walls of the crater itself, to name just a few," said Andrew Johnson, principal robotics systems engineer at NASA's Jet Propulsion Laboratory in Southern California. "So, if you land on one of those hazards, it could be catastrophic to the whole mission."

Enter Terrain-Relative Navigation (TRN), the mission-critical technology at the heart of the LVS that captures photos of the Mars terrain in real time and compares them with onboard maps of the landing area, autonomously directing the rover to divert around known hazards and obstacles as needed.

Masten's Xombie VTVL system sits on a launchpad in Mojave, California in December 2014, prepared for a flight test that would help prove lander vision system capabilities for the Mars 2020 Perseverance rover mission.
Credit: Masten Space Systems

"For Mars 2020, LVS will use the position information to figure out where the rover is relative to safe spots between those hazards. And in one of those safe spots is where the rover will touch down," explained Johnson.

If Johnson sounds confident that LVS will work to land Perseverance safely, that's because it allows the rover to determine its position relative to the ground with an accuracy of about 200 feet or less. That low margin of error and high degree of assurance are by design, and the result of extensive testing both in the lab and in the field.

"We have what we call the trifecta of testing," explained JPL's Swati Mohan, guidance, navigation, and control operations lead for Mars 2020.

https://youtu.be/NdNuyznPpbs?list=PLTiv_XWHnOZqCrMU2ppcLjRn1zlDkNx3q

2014 flight tests on Masten's Xombie VTVL system demonstrated the lander vision system's terrain-relative navigation and fuel-optimal large divert guidance (G-FOLD) capabilities. The flights proved the system's ability to autonomously change course to avoid hazards on descent and adopt a newly calculated path to a safe landing site. The successful field tests enabled the technology to be greenlighted for inclusion on NASA's Mars 2020 mission. Credit: NASA/JPL-Caltech

Mohan said that the first two testing areas – hardware and simulation – were done in a lab.

"That's where we test every condition and variable we can. Vacuum, vibration, temperature, electrical compatibility – we put the hardware through its paces," said Mohan. "Then with simulation, we model various scenarios that the software algorithms may encounter on Mars – a too-sunny day, very dark day, windy day – and we make sure the system behaves as expected regardless of those conditions."

But the third piece of the trifecta – the field tests – require actual flights to put the lab results through further rigor and provide a high level of technical readiness for NASA missions. For LVS's early flight tests, Johnson and team mounted the LVS to a helicopter and used it to estimate the vehicle's position automatically as it was flying.

"That got us to a certain level of technical readiness because the system could monitor a wide range of terrain, but it didn't have the same kind of descent that Perseverance will have," said Johnson. "There was also a need to demonstrate LVS on a rocket."

That need was met by NASA's Flight Opportunities program, which facilitated two 2014 flights in the Mojave Desert on Masten Space Systems' Xombie – a vertical takeoff and vertical landing (VTVL) system that functions similarly to a lander. The flight tests demonstrated LVS's ability to direct Xombie to autonomously change course and avoid hazards on descent by adopting a newly calculated path to a safe landing site. Earlier flights on Masten's VTVL system also helped validate algorithms and software used to calculate fuel-optimal trajectories for planetary landings.

"Testing on the rocket laid pretty much all remaining doubts to rest and answered a critical question for the LVS operation affirmatively," said JPL's Nikolas Trawny, a payload and pointing control systems engineer who worked closely with Masten on the 2014 field tests. "It was then that we knew LVS would work during the high-speed vertical descent typical of Mars landings."

Johnson added that the suborbital testing in fact increased the technology readiness level to get the final green light of acceptance into the Mars 2020 mission.

"The testing that Flight Opportunities is set up to provide was really unprecedented within NASA at the time," said Johnson. "But it's proven so valuable that it's now becoming expected to do these types of flight tests. For LVS, those rocket flights were the capstone of our technology development effort."

With the technology accepted for Mars 2020, the mission team began to build the final version of LVS that would fly on Perseverance. In 2019, a copy of that system flew on one more helicopter demonstration in Death Valley, California, facilitated by NASA's Technology Demonstration Missions program. The helicopter flight provided a final check on over six-years of multiple field tests.

But Mohan pointed out that even with these successful demonstrations, there will be more work to do to ensure a safe landing. She'll be at Mission Control for the landing, monitoring the health of the system every step of the way.

"Real life can always throw you curve balls. So, we'll be monitoring everything during the cruise phase, checking power to the camera, making sure the data is flowing as

expected," Mohan said. "And once we get that signal from the rover that says, 'I've landed and I'm on stable ground,' then we can celebrate."

About Flight Opportunities

The Flight Opportunities program is funded by NASA's Space Technology Mission Directorate (STMD) and managed at NASA's Armstrong Flight Research Center in Edwards, California. NASA's Ames Research Center in California's Silicon Valley manages the solicitation and evaluation of technologies to be tested and demonstrated on commercial flight vehicles.

About Technology Demonstration Missions

Also under the umbrella of STMD, the program is based at NASA's Marshall Space Flight Center in Huntsville, Alabama. The program bridges the gap between scientific and engineering challenges and the technological innovations needed to overcome them, enabling robust new space missions.

A key objective for Perseverance's mission on Mars is astrobiology, including the search for signs of ancient microbial life. The rover will characterize the planet's geology and past climate, pave the way for human exploration of the Red Planet, and be the first mission to collect and cache Martian rock and regolith (broken rock and dust).

Subsequent missions, currently under consideration by NASA in cooperation with the European Space Agency, would send spacecraft to Mars to collect these cached samples from the surface and return them to Earth for in-depth analysis.

The Mars 2020 mission is part of a larger program that includes missions to the Moon as a way to prepare for human exploration of the Red Planet. Charged with returning astronauts to the Moon by 2024, NASA will establish a sustained human presence on and around the Moon by 2028 through NASA's Artemis lunar exploration plans.

JPL, which is managed for NASA by Caltech in Pasadena, California, built and manages operations of the Perseverance rover.

For more about Perseverance: www.mars.nasa.gov/mars2020/

and

www.nasa.gov/perseverance

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Music for a Quiet Sunday

Ralph Vaughan Williams (1878-1958)

Vaughan Williams is among the best-known British symphonists, noted for his very wide range of moods, from stormy and impassioned to tranquil, from mysterious to exuberant. Among the most familiar of his other concert works are Fantasia on a Theme by Thomas Tallis (1910) and The Lark Ascending (1914). His vocal works include hymns, folk-song arrangements and large-scale choral pieces. He wrote eight works for stage performance between 1919 and 1951. Although none of his operas became popular repertoire pieces, his ballet Job: A Masque for Dancing (1930) was successful and has been frequently staged.

Two episodes made notably deep impressions in Vaughan Williams's personal life. The First World War, in which he served in the army, had a lasting emotional effect. Twenty years later, though in his sixties and devotedly married, he was reinvigorated by a love affair with a much younger woman, who later became his second wife. He went on composing through his seventies and eighties, producing his last symphony months before his death at the age of eighty-five. His works have continued to be a staple of the British concert repertoire, and all his major compositions and many of the minor ones have been recorded.

Fantasia on a Theme by Thomas Tallis;
https://www.youtube.com/watch?v=0U6sWqfrnTs

Lark Ascending; https://www.youtube.com/watch?v=FaO0432Gl18

Orchestral Works; https://www.youtube.com/watch?v=God7bXyKkdA

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Majority of the US Has a Smaller Population than LA County

If there is one thing to say Los Angeles County in southern California, it is packed tighter than a tin of sardines. With a population of 10 million, according to the 2019 census, the single county of LA out-populates a vast majority of the United States, as shown above.

Granted, North Carolina and Georgia should join Ohio, Illinois, New York, Florida, Texas, and Pennsylvania on this map. As of 2019, North Carolina just makes it past LA County's population with 10.49 million people, while Georgia's population comes in at 10.62 million.

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Movies Worth a Twentieth Look

Duck Soup; The Marx Brothers

https://www.youtube.com/watch?v=qSabiG8q8-k&list=PLfapnNfPhoBiV4TdFroGEEiZATHkNRAjx

https://youtu.be/9CEdb0sGfaI

This classic from 1933 follows Rufus T. Firefly (Groucho) who is instated as leader of the fictional country of Freedonia, but his tenure is jeopardized when two spies (Harpo and Chico) infiltrate Firefly's orbit, looking for dirt on him. The comedy wasn't the most popular at its time of release, but in the 90 or so years since it landed in theaters, it's been revered as a masterpiece and a must-watch classic for any comedy fan who's anyone.

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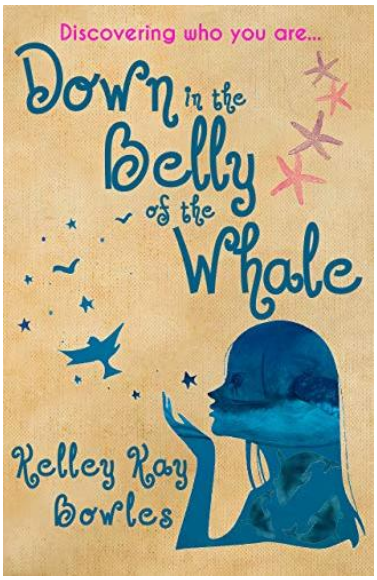
Dog, Bubbles, Baby...Hysteria on the Woof

https://youtu.be/gnagemulucw

Sent to me by my favorite Young Adult author, Kelley Bowles. Want to shed a bunch of years? Get her book, *Down in the Belly of the Whale*.



Better still get it as an Audiobook and hear it from Kelley's own mouth.

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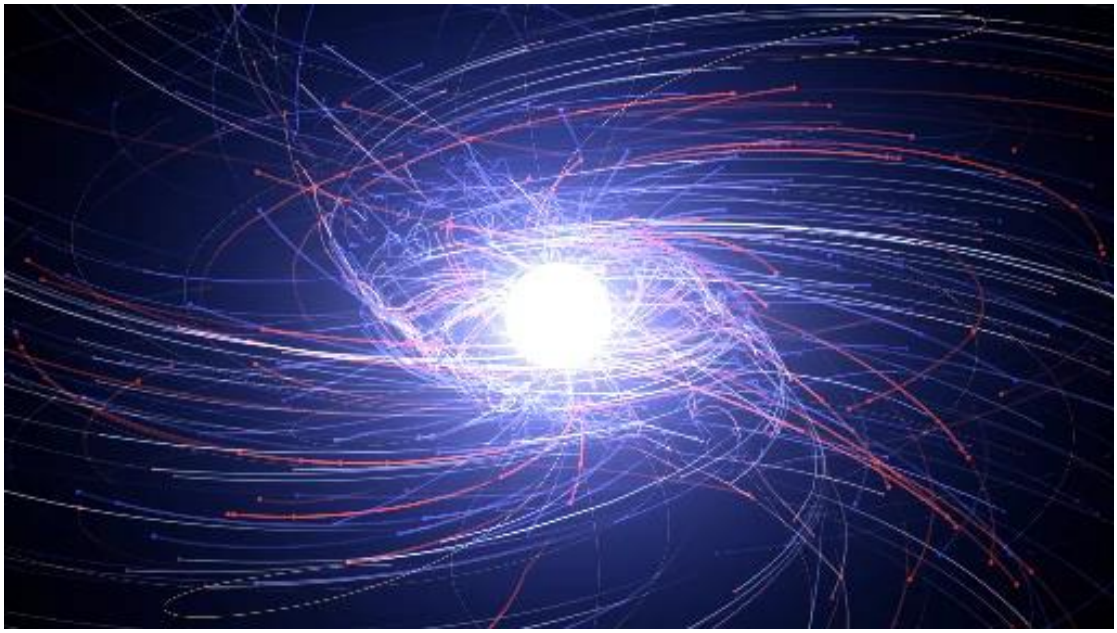
Could There Be a Cluster of Antimatter Stars Orbiting Our Galaxy?

By Paul Sutter

Antimatter shed by anti-stars could even be detectable here on Earth.



Electrons and their antimatter counterparts, positrons, interact around a neutron star in this visualization. Why is there so much more matter than antimatter in the universe we can see?
(Image: © NASA's Goddard Space Flight Center)

Paul M. Sutter is an astrophysicist at SUNY Stony Brook and the Flatiron Institute, host of Ask a Spaceman and Space Radio, and author of How to Die in Space. He contributed this article to Space.com's Expert Voices: Opinions and Insights.

We don't know why the universe is dominated by matter over antimatter, but there could be entire stars, and maybe even galaxies, in the universe made of antimatter.

The anti-stars would continuously shed their antimatter components out into the cosmos, and could even be detectable as a small percentage of the high-energy particles hitting Earth.

Unbalanced birth

Antimatter is just like normal matter, except not. Every single particle has an anti-particle twin, with the exact same mass, exact same spin and exact same everything. The only thing different is the charge. For example, the anti-particle of the electron, called the positron, is exactly like the electron except that it has positive electric charge.

Our theories of fundamental physics point to a special kind of symmetry between matter and antimatter — they mirror each other almost perfectly. For every particle of matter in the universe, there ought to be a particle of antimatter. But when we look around, we don't see any antimatter. Earth is made of normal matter, the solar system is made of normal matter, the dust between galaxies is made of normal matter; it looks like the whole universe is entirely composed of normal matter.

There are only two places where antimatter exists. One is inside our ultra-powerful particle colliders: When we turn them on and blow up some subatomic stuff, jets of both normal and antimatter pop out. The other place is in cosmic rays. Cosmic rays aren't really rays but rather are streams of high-energy particles streaking in from across the cosmos and hitting our atmosphere. Those particles come from ultra-powerful processes in the universe, like supernovae and colliding stars, and so the same physics applies.

But why is antimatter so rare? If matter and antimatter are so perfectly balanced, what happened to all the anti-stuff? The answer lies somewhere in the early universe.

The anti-galaxy

We're not exactly sure what did it, but something went off balance in the young cosmos. Presumably in the good old days (and I'm talking when the universe was less than a second old here), matter and antimatter were produced in equal amounts. But then something happened; something caused more matter to be produced than antimatter. It wouldn't take much, just a one part per billion imbalance, but it would be enough for normal matter to come to dominate essentially the entire universe, eventually forming stars and galaxies and even you and me.

But whatever that process was — and I should mention that the detailed physics of that antimatter-killing mechanism in the early universe are currently beyond known physics, so there's a lot up in the air here — it may not have been entirely perfect. It's totally

possible that the early universe may have left large clumps of antimatter alone, floating here and there throughout the universe.

Those clumps, if they survived long enough, would grow up in relative isolation. Sure, when matter and antimatter collide, they annihilate each other in a flash of energy, and that would've caused some headaches in the early universe, but if the antimatter clumps made it through that trial, they would've been home free.

Over the course of billions of years, those clumps of antimatter could have assembled together and grown larger. Remember that the only difference between antimatter and matter is their charge — all other operations of physics remain exactly the same. So you can form anti-hydrogen, anti-helium, and anti-all-the-other-elements. You can have anti-dust, anti-stars fueled by anti-fusion, anti-planets with anti-people drinking refreshing anti-glasses of anti-water, the works.

Counting backward

Astronomers don't suspect that there are entire anti-galaxies floating around out there, because their interactions with normal matter (say, when two galaxies collide) would release quite a bit of energy — enough for us to notice by now. But smaller clumps could be possible. Smaller clumps like globular clusters.

Globular clusters are small, dense clumps of fewer than a million stars orbiting larger galaxies. They are thought to be incredibly old, as they are not forming new stars in the present epoch, and are instead filled with small, red, aged populations. They are also relatively free of gas and dust — all the fuel you need to make new stars. They just sort of hang around, orbiting lamely around their larger, more active cousins, remnants of a bygone and largely forgotten era. The Milky Way itself has a retinue of about 150 of them.

And some of them may be made of anti-stars.

A team of theoretical astrophysicists calculated what would happen if one of the globular clusters orbiting the Milky Way was actually an anti-cluster, as reported in a paper recently appearing in the preprint journal arXiv. They asked a simple question: what would happen?

Unless the globular cluster plunged right through the disk of the Milky Way, it wouldn't really blow up. Since the anti-cluster would just be made of stars, and stars don't take up a lot of volume, there aren't a lot of opportunities for big booms. Instead, the anti-stars in the anti-cluster would go about their normal lives, doing normal star-like things.

Things like emitting a constant stream of particles. Or having huge flare and coronal mass ejection events. Or colliding with each other. Or dying in fantastic supernova explosions.

All those processes would release tons of antiparticles, sending them flowing out of the anti-cluster and into the nearby volume of the universe, including the Milky Way. Including our solar system, where those antiparticles would appear as just another part of the cosmic ray gang.

So could some of the anti-particles hitting our atmosphere every single day have been launched by an anti-star millions of years ago? Right now it's too difficult to tell. There are certainly anti-particles mixed in as a part of the total cosmic ray population, but because our galaxy's magnetic field alters the paths of charged particles (normal and anti alike), it's hard to tell exactly where a particular cosmic ray actually came from.

But if astronomers are able to pinpoint a globular cluster as a particularly strong source of anti-particles, it would be like opening a time capsule, giving us a window into the physics that dominated the universe when it was only a second old.

We also couldn't ever visit the anti-cluster, because as soon as we did we would blow up.

Join our Space Forums to keep talking space on the latest missions, night sky and more! And if you have a news tip, correction or comment, let us know at: community@space.com .

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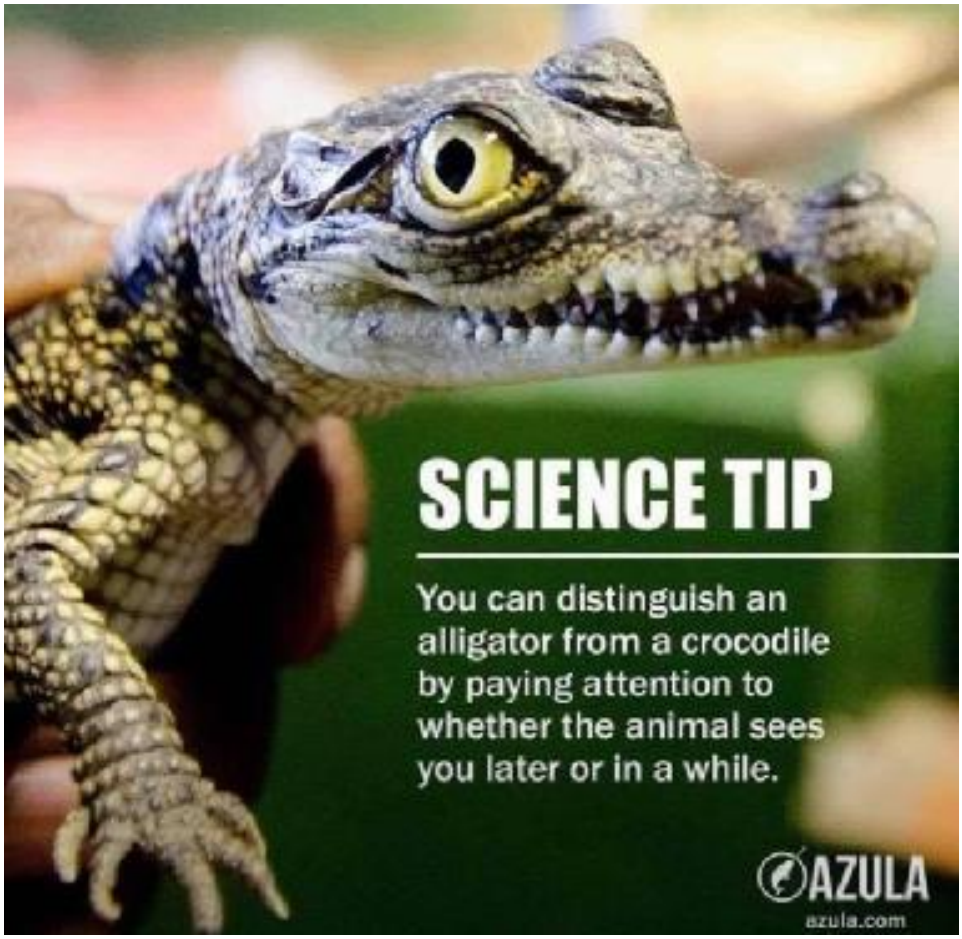

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A Diesel Generator to Power an Electric Recharge Stand?

I don't know, but this seems to fly in the face of…oh hell, whatever works.

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SpaceX Falcon Heavy to launch 1st Gateway Station Pieces into Lunar Orbit

By Amy Thompson for Space.com

Artist's concept of the Gateway power and propulsion and Habitation and Logistics Outpost (HALO) in orbit around the moon.
|(Image: © NASA)

CAPE CANAVERAL, Fla. — NASA has selected SpaceX to deliver the first two segments of the moon-orbiting Gateway space station for its upcoming Artemis program, which aims to put astronauts back on the moon. The elements will launch atop a Falcon Heavy rocket, sometime in 2024.

The flight, which is the second to be awarded to SpaceX this week (the first was a contract worth $98.8 million to launch NASA's SPHEREx astrophysics mission) will carry the Gateway's power and habitation modules. Launching from Pad 39A at NASA's Kennedy Space Center in Florida, the mission will cost NASA $331.8 million and is scheduled to blast off no earlier than May 2024.

Once deposited in lunar orbit, the Gateway will serve as an outpost for astronauts and equipment heading to the moon as part of NASA's Artemis program. Roughly one-sixth the size of the International Space Station, the Gateway will support research investigations, crew, and expeditions to the lunar surface.

The outpost will serve as a docking station for visiting spacecraft, such as NASA's Orion spacecraft and will orbit the moon, tens of thousands of miles away. It will be a pit stop on the way to the lunar surface. NASA recently paused its search for a human landing system, which will transport astronauts from the gateway down to the surface of the moon. The agency is expected to resume reviewing those bids soon.

The pair of modules SpaceX will ferry into space are the power and propulsion element (PPE) and the habitation and logistics outpost (HALO), which are being built by Maxar Technologies and Northrop Grumman Space Systems, respectively.

The PPE will provide the Gateway with power, enabling communications as well as helping the station move to various lunar orbits, while HALO will give astronauts a place to stay on their way to the moon. Astronauts traveling to the moon will launch aboard crew-toting capsules, like Orion, and HALO will provide docking support for those vehicles. The European Space Agency will be providing the service module for the Gateway, which includes key life support elements, including consumables like oxygen and water, as well as electricity and temperature controls. That hardware is scheduled to launch on NASA's second planned flight of its new megarocket, the Space Launch System (SLS). That mission, called Artemis 2, will be the first crewed mission of the Artemis program. It is scheduled to launch four astronauts on a loop around the moon in 2023, in preparation for a 2024 moon landing with the Artemis 3 mission. The first SLS flight, scheduled to launch in late 2021, will be an uncrewed test flight around the moon.

Officials at ESA have said that the life support systems on the Gateway will be able to host visiting astronauts for up to 90 days at a time. NASA's Johnson Space Center in Texas will manage the Gateway program, while the agency's Launch Services Program (LSP) at Kennedy Space Center will manage the launch.

Follow Amy Thompson on Twitter @astrogingersnap. Follow us on Twitter @Spacedotcom or Facebook.

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Game Changers

The Race to Save Lives: Vaccine Development Timelines

View the high-resolution of the infographic by clicking here.

Major advancements in medicine have led to a significant increase in average life expectancy, with vaccines being hailed as one of the most successful interventions to date.

In fact, the World Health Organization estimates that vaccines have prevented 10 million deaths between 2010 and 2015 alone. But while some were created and distributed in just over four months, others have taken over 40 years to develop. Then again, previous pandemics have petered out without any vaccine at all.

With approved COVID-19 vaccines soon to be distributed across the globe, the vaccine development process is being scrutinized by experts (and non-experts) the world over.

In the graphic above, we explore how long it has historically taken to bring a vaccine to market during pandemics dating back to the 1900s, and what the process entails.

Pandemic Vaccines of the Past

Although the assumption can be made that developing a vaccine for infectious diseases has become more efficient since the 1900s, that statement is not entirely correct.

It took approximately 25 years to develop a vaccine for the Spanish Flu which killed between 40-50 million people. Similarly, it was only last year that the FDA approved the first Ebola vaccine—an effort that took 43 years since the discovery of the virus.

But while scientists and medical experts have made headway in stopping major pandemics in their tracks, some of the worst outbreaks in history have yet to be cured.

Here is a closer look at the timeframes for vaccine development for every pandemic since the turn of the 20th century:

Name of Pandemic

Pandemic	Death Toll	Vaccine Development	Duration
Spanish flu	40-50 million	1917-1942	25 years
H2N2 Asian flu	1.1 million	Feb 1957-Jun 1957	<5 months
H3N2 Hong Kong Flu	1 million	Jul 1968-Nov 1968	<5 months
SARS	774	2003-present	(ongoing)
Ebola	11,300	1976-2019	43 years
AIDS	25-35 million	1981-present	(ongoing)
H1N1 Swine Flu	151,700 - 575,400	Apr 2009-Sept 2009	6 months
MERS	858	2012-present	(ongoing)
Coronavirus	1.64 million	Dec 2019-Nov 2020	11 months

When it comes to the speedy development of a COVID-19 vaccine, funding has played a vital role. With case numbers growing at an alarming rate, demand and urgency for a vaccine are high. In the U.S., the government paid Pfizer and BioNTech almost $2 billion for 100 million doses of a safe vaccine for COVID-19. This level of support from governments the world over means that pharmaceutical giants have less financial uncertainties to deal with compared to other vaccines.

Even though the global endeavor to distribute COVID-19 vaccines is now underway, many experts are concerned that the pace of approval could compromise long-term safety—but there are rigorous steps a vaccine must first go through before it is approved.

The Journey of a Vaccine Candidate

On average, it takes 10 years to develop a vaccine. According to the CDC, there are six stages involved in the process from start to finish:

Exploratory stage: This stage typically consists of basic lab research that can last anywhere from 2 to 4 years.

Pre-clinical stage: This stage uses tissue-culture or cell-culture systems and animal testing to give researchers an idea of how humans might respond to a candidate vaccine.

Clinical development: Within the clinical development stage, there are three phases. Phase 1 examines the response of a small group of people to a candidate vaccine. Phase 2 involves giving the candidate vaccine to a larger group of people to study its safety, immunogenicity, proposed doses, schedule of immunizations, and method of delivery. In Phase 3, the vaccine is given to thousands of people to further test for efficacy and safety.

Regulatory review and approval: National Regulatory Authorities are responsible for the approval of vaccines in different countries. For example, the U.S. Food and Drug Administration's Center for Biologics Evaluation and Research (CBER) regulates all U.S. vaccines.

Manufacturing: Typically, it can take anywhere from 6 to 36 months to produce, package, and deliver a high quality vaccine.

Quality control: Different batches of a vaccine are continuously tested by different authorities around the world to ensure its ongoing safety.

Despite these lengthy timeframes, the COVID-19 vaccines and subsequent candidates have overturned the conventional process due to their unconventional technology.

Innovative Technologies Driving COVID's Cure

Even though there are no approved vaccines for other coronaviruses such as MERS and SARS, previous research into these diseases has helped identify potential solutions for COVID-19 using messenger RNA (mRNA) technology.

"The mRNA vaccine platform technology [which the Pfizer/BioNTech vaccine uses] has been in development for over two decades."
—Dr Zoltán Kis, Imperial College London.

The technology instructs our bodies to produce a small part of the COVID-19 virus called a spike protein. This triggers the immune system to make antibodies to fight against it and prepares the body for an actual COVID-19 infection.

Containing COVID-19 Batch-by-Batch

Deployment of a safe and effective vaccine could have the potential to save millions of lives and prevent infection for many more.

Although some experts have criticized the speed of vaccine candidate approvals, the quality will be closely monitored on a batch-by-batch basis.

With the COVID-19 crisis showing no signs of slowing down, most of us continue to live in hope that the light is at the end of the tunnel.

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