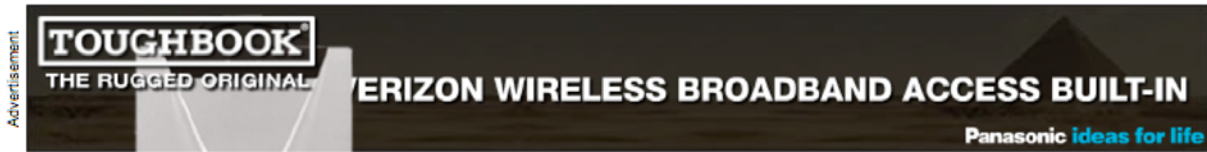


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# Life's ingredients may have 'sprinkled' on Earth

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Enlarge NASA Goddard Space Flight Center via Reuters

A new computer model indicates clouds of adenine molecules, a basic component of DNA, could have formed in space and sprinkled on Earth to be part of a list of crucial ingredients for life.



By Dave Mosher, **SPACE.com**

Some crucial ingredients for life on Earth may have formed in interstellar space, rather than on the planet's surface.

A new computer model indicates clouds of adenine molecules, a basic component of DNA, can form and survive the harsh conditions of space, and possibly sprinkle onto planets as the stars they orbit travel through a galaxy.

"There may be only a few molecules of adenine per square foot of space, but over millions of years, enough could have accumulated to help make way for life," said study co-author Rainer Glaser, a molecular chemist at the University of Missouri-Columbia.

Glaser and his team's findings are detailed in a recent issue of the journal *Astrobiology*.

### Spacey chemistry

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Adenine is one of four "letters" of DNA's alphabet used to store an organism's genetic code. Glaser said the idea that large, two-ringed organic molecules like adenine formed in space may seem outrageous, but current evidence leaves the possibility wide open.

"You can find large molecules in meteorites, including adenine," Glaser said. "We know that adenine can be made elsewhere in the solar system, so why should one consider it impossible to make the building blocks somewhere in interstellar dust?"

Using computer simulations of the cold vacuum of space, Glaser and his colleagues found that hydrogen cyanide (HCN) gas can build adenine. Like pieces in a set of tinker toys, hydrogen cyanide serves as adenine's building blocks; the small molecules bond together into chains and, with a little wiggling, eventually assemble into rings.

Although adenine's first ring needs a tiny energy boost from starlight to form, Glaser said the second ring of the molecule self-assembles without any outside help.

"When you want to have a reaction, you usually need to heat it up," Glaser said. "It's remarkable to find a reaction that doesn't require activation energy. If you do this reaction in space, this is a huge advantage because it takes a long time for a molecule to be hit by a piece of light."

### Seasoned for life?

Glaser said adenine's ringed shape helps it absorb and release any excess energy without breaking apart, making it stable enough to form concentrated clouds that planets can drift through.

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While getting adenine safely onto a rocky planet's surface is a less developed idea, Glaser said many chemists have barely toyed with the notion that life's basic ingredients formed off of the planet's surface.

"We're at a very early stage of anybody even thinking about these things," he said. "The discussion of life's origin has been highly focused on the idea of a warm pool of liquid on the planet's surface." But Glaser said recent discoveries of planets around distant stars is changing that focus.

"Chemistry in space isn't the chemistry most of us are trained for," Glaser said. "We should take a much bigger approach: Where are all the chemicals in the galaxy and its solar systems, and what can you do with them?"

Antonio Lazcano, an evolutionary biologist at the National Autonomous University of Mexico who has studied life origins for the past 30 years, said Glaser and his colleagues' work is compelling.

"We already know hydrogen cyanide is abundant in interstellar clouds, and it's been suggested that comets can bring some of that material onto planets," Lazcano said. For Glaser and his team's idea to be widely supported, however, adenine needs to be detected in the deep space clouds, Lazcano said.

"The likelihood of detection is very small, but it's still possible," he said. "If astronomers can better eliminate background noise, I think we'll have equipment sensitive enough to detect adenine dust clouds."

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Posted 1d 7h ago

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fiddler8 wrote: 10h 19m ago  
goodshorts wrote: 14h 30m ago  
DeaconGene stated:  
"..."

this is exactly right! it is as if the ONLY thing that has been observed to "evolve" is the very theory of evolution itself.

\*\*\*\*\*

Seems like goodshorts may be approaching an appreciation of the truth about the scientific nature of the study of evolution, even if it is a thruth he does not wish to admit.

Science is an evolutionary approach to understanding the truth. Scientists look at what has been proposed in the past (old theories), make predictions from these theories, and then test these predictions against current reality. These tests can consist of doing something in a test tube, growing plants or animals, looking at old bones, digging up stuff which has been burried for a long time, looking through a telescope, etc. If a test disagrees with the theory, a new theory is formulated to explain what the old theory explained, together with the new results. Often the new theory is a slight modification of the old, resulting in a long sequence of theories, each quite similar to the preceeding and following modifications and with increasing differences compared to the more distantly related versions. In other words, the theories form an evolutionary sequence.

Religion, on the other hand, has a tendency to be based on the words of some prophet (or some other revelation delivered, often in an instant, to some special person). Most religious study consists of reading or contemplating these old words. It is very difficult for the religion to change, unless a new prophet comes along and reveals that the Deity has declaired the old prophet to have been inspired by the wrong entity. Another method is to dispute the transmission of what the old prophet said.

Thus, for example, the followers of the prophet Mohammed claim that everything that Jesus said was true, but that all of the written records about him have been corrupted by a certain ethnic group -- well, the only uncorrupted version consists of what Mohammed prophesied that Jesus had previously prophesied.

This characteristic of evolving understanding, rather than a hidebound adherence to "mouldy oldie" documents, is one of the clearer ways of distinguishing science from religion. Thus, when an anti-evolutionist makes ad hominem attacks against Darwin (suggesting that he should not be considered a valid prophet), the anti-evolutionist is showing that he is objecting that evolution is not a viable religion, not that it is bad science. Similarly, when people like DeaconGene and goodshorts complain that "the very theory of evolution itself" is evolving, they are admitting that the theory of evolution is indeed an example of science, not religion.

The logical problem comes when such anti-evolutionists try to claim that this evolution of the theory of evolution proves that

- (1) the theory of evolution is a religion, not science, and
- (2) that evolution does not occur.

How can an observation that a theory is evolving prove that nothing evolves? Why would goodshorts claim to observe the evolution of the theory of evolution, and also claim that evolution has not been observed?

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**fiddler8** wrote: 11h 11m ago

goodshorts wrote: 16h 27m ago

fiddler8, I don't see any clear logic in what you state, here is an example  
"Evolution occurs. If God created evolution" (let me just interrupt here, evolution has never been observed) ", then evolution still occurs. If God never existed, evolution still occurs."

let me replace the word "evolution" with "magic fairies" in that argument, just to show the logic. magic fairies occur (never been observed), if God created magic fairies, then magic fairies still occur. If God never existed, then magic fairies still occur.

\*\*\*\*\*

As is well known, evolution has been observed. To show the moral depravity of goodshorts, allow me to use his method of logical substitution by replacing the word "I" with the phrase "I, goodshorts, who admit that I am committing slander in the Name of Him who said "Thou shalt not slander,"" and by adding parenthetical comments inside what is claimed to be the logical equivalent of another's post:

I, goodshorts, who admit that I am committing slander in the Name of Him who said "Thou shalt not slander," don't see any clear logic in what you state (even though I recognize what you stated as God's own truth)...

Come on, goodshorts. If the only way you can object to what I say is by changing my words, then you must know that I speak the truth. If you truly believe that changing another's words is a path to truth, then you have already agreed with the bogus "confession" printed above.

(Just in case you are indeed as dull-witted as you claimed in stating that you could not follow my logic, allow me to clarify. The question of whether or not evolution occurs has nothing whatsoever to do with the matter of whether or not God, or any other postulated deity or magical entity, either so much as exists or has ever created anything at all, including evolution.

Using your proposed substitution, this yields:

The question of whether or not magic fairies occurs has nothing whatsoever to do with the matter of whether or not God, or any other postulated deity or magical entity, either so much as exists or has ever created anything at all, including magic fairies.)

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**EurosnoB** wrote: 12h 1m ago

"A new computer model indicates clouds of adenine molecules, a basic component of DNA, can form and survive the harsh conditions of space, and possibly sprinkle onto planets....."

.....and all that happened exactly 6000 thousand years ago. :) And suddenly all the dinos made their appearance on earth and Eve and Adam's children played with them. ....or either they had DinoMcNugget every Sunday, to celebrate the glorious Intelligent Designer.  
;-) ;-)

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**panthergrowl** wrote: 12h 5m ago



God created the heavens and the earth. God created man and the animals. Keep on searching and guessing scientists. The answer has already been given to you. Seek the Lord and he will truly bless you.

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**toxic** wrote: 16h 21m ago

For any athiest out there: "I would rather go through life believing there is a God and die and find out there is not; then go through life not beleiving in Him and die and find out He does exist."

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**CompMan** wrote: 16h 55m ago

Evansmom, it's also sad to see people who call themselves Christians yet disbelieve accounts in the Bible. Is that some sort of hybrid Christian?

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**shamrock** wrote: 18h 54m ago

When scientists use words like: "may have", "possibly" and "could have", it only proves that they are still guessing! Earth is the only planet in our Solar System with sustainable life. If this theory is to be given any credibility, then scientist need also to explain why only our planet benefited from all these bouncing molecules while zillions of planets around us never did. As for atheists... they prefer proof over faith; I have to wonder why Earth's survival against all these odds isn't enough for anyone to realize there is a higher being involved. Earth is a beautiful wonder with bountiful lifeforms that actually depend on each other to survive.... this didn't "Just Happen"!

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**sweetleafaz** wrote: 21h 56m ago

Well said evansmom, I agree with it all, except the god part, but to each his own. See Athiest and Christians can agree.

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**evansmom** wrote: 22h 48m ago

It is sad to see such closed minded people. These are the same people that went with the belief that Earth was the center of the universe for 2,000 years after it was shown to not be. I am a Christian, but I am also a scientist. I will not let my religion cause ignorance to what has been happening here on Earth. Remember, science has proven religion wrong too many times to count, but when has religion ever proven science to be wrong? There is no reason to be so close-minded when you are a Christian. I believe God created all, but I don't think we just magically appeared one day, no, it was a slow process over billions of years (not including the time it took to even start the universe)

For those that cannot see that evolution has occured, what about the microevolution we can observe first hand? What is that than? Don't let ignorance overpower knowledge.

Also, why do humans share genes with multiple organisms? Why do we all use hox genes for example, why are we all composed of the same material (DNA, RNA, proteins, etc)?

Also, when a species evolves into a new species by geographical isolation, what do the radical Christians call that? It is a component of evolution, turning your cheek, doesn't change truth.

Over time we will learn more as scientists, just as religions change over time also. Scientists try to understand more and more. Why is that bad? We are looking for hard facts before us, rather than just allowing faith or assumptions to drive it a belief. You cannot say that is bad thing.

Additionally, people that are ignorant and believe that evolution states we came from monkeys, please educate yourself. Evolution was a long process from the negining of time till now. I have a MS in Molecular and Cellular Biology, if you need info, post back and I will send you some. The problem with most of the people that are radical Christians is, they do not have a formal science education (not all, but most). Do your research. I know about Christianity and science, so I think I can actually formulate an educated opinion. I feel most people should do the same before posting uneducated opinions.

Do I believe we will ever know how God did it? No, but there is no hurt in explaining things we see happening here on Earth. Will we ever think to his complexity? I don't believe so, but it is worth a try to understand the complexity God has created here. I don't seem the harm or outrage these Christians who let people tell them what is wrong rather than just reading the Bible. I haven't seen anywhere in the Bible that it is wrong to believe in evolution. So, I won't see that there is anything

wrong.

For the Christians that get so ticked by evolution, I just honestly want to know why this bothers you so much, when the Christian faith goes against its own values and teaching all the time. Think of idols, calling no man other than God father (what do Catholics call priest?), tattoos, piercings, even the WEDDING RING...when you take a history class in religion (yes, I went to Methodist College, even though I am non-denominational) you see the hypocrisy of Christianity, but yet we will accept that?

For the person (I believed the deacon)that talked about mutations...most mutations are NOT considered "defects". We have mutations that are advantageous, neutral and "bad".Look at the DNA of children compared to parents and I want you to tell me that there are no mutations. Do we see all mutations? No. Depending on the environment depends a lot of time if your mutation will "help" or "hurt" you. It is called chance.

The primordial soup has worked, Miller was the scientist that showed his works in the lab. Sorry, Deacon, you are wrong.

That also helps link to why we have electrical impulses in our body. Why the embryo needs an electrical pulse to start division. All the components work together for a whole picture. Once you learn about all these small components it is amazing what God did. The complexity is outstanding.

I just hope if more religious leaders, like the deacon on here, actually learns more about science, because what he is posting is comical. People that lack knowledge of a subject matter don't even notice when the information they are using lacks knowledge. (especially with the mutation one, using one excerpt, doesn't showing anything except bad research)

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**gottessegen** wrote: 23h 52m ago

After reading some of the posts, too many and like tennis, I must say you all have really good points.

But until you have the love of Christ in you, and I mean truly, you won't be able to see the truth. As Jesus said, "it is not given to you to know the truth."

Sorry. Don't mean to hurt anyone. It's always true that I cannot judge one person because I have no idea what God has planned for that person. So please don't think I'm judging anyone here or anywhere for that matter!

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