# Snakes could be the source of the Wuhan coronavirus outbreak

(CNN)Snakes -- the Chinese krait and the Chinese cobra -- may be the original source of the newly discovered coronavirus that has triggered an outbreak of a deadly infectious respiratory illness in China this winter.

The many-banded krait (Bungarus multicinctus), also known as the Taiwanese krait or the Chinese krait, is a highly venomous species of elapid snake found in much of central and southern China and Southeast Asia.

The illness was first reported in late December 2019 in Wuhan, a major city in central China, and has been rapidly spreading. Since then, sick travelers from Wuhan have infected people in China and other countries, including the United States.

Using samples of the virus isolated from patients, scientists in China have determined the genetic code of the virus and used microscopes to photograph it. The pathogen responsible for this pandemic is a new coronavirus. It's in the same family of viruses as the well-known severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV), which have killed hundreds of people in the past 17 years. The World Health Organization (WHO) has named the new coronavirus 2019-nCoV.

We are virologists and journal editors and are closely following this outbreak because there are many questions that need to be answered to curb the spread of this public health threat.

What is a coronavirus?

The name of coronavirus comes from its shape, which resembles a crown or solar corona when imaged using an electron microscope.

The electron microscopic image, reveals the crown shape structural details for which the coronavirus was named. This image is of the Middle East respiratory syndrome coronavirus (MERS-CoV). National Institute of Allergy and Infectious Diseases (NIAID)

Coronavirus is transmitted through the air and primarily infects the upper respiratory and gastrointestinal tract of mammals and birds. Though most of the members of the coronavirus family only cause mild flu-like symptoms during infection, SARS-CoV and MERS-CoV can infect both upper and lower airways and cause severe respiratory illness and other complications in humans.

This new 2019-nCoV causes similar symptoms to SARS-CoV and MERS-CoV. People infected with these coronaviruses suffer a severe inflammatory response.

Unfortunately, there is no approved vaccine or antiviral treatment available for coronavirus infection. A better understanding of the life cycle of 2019-nCoV, including the source of the virus, how it is transmitted and how it replicates are needed to both prevent and treat the disease.

Read: What exactly is a coronavirus?

Zoonotic transmission

Both SARS and MERS are classified as zoonotic viral diseases, meaning the first patients who were infected acquired these viruses directly from animals. This was possible because while in the animal host, the virus had acquired a series of genetic mutations that allowed it to infect and multiply inside humans.

Now these viruses can be transmitted from person to person. Field studies have revealed that the original source of SARS-CoV and MERS-CoV is the bat, and that the masked palm civets (a mammal native to Asia and Africa) and camels, respectively, served as intermediate hosts between bats and humans.

In the case of this 2019 coronavirus outbreak, reports state that most of the first group of patients hospitalized were workers or customers at a local seafood wholesale market which also sold processed meats and live consumable animals including poultry, donkeys, sheep, pigs, camels, foxes, badgers, bamboo rats, hedgehogs and reptiles. However, since no one has ever reported finding a coronavirus infecting aquatic animals, it is plausible that the coronavirus may have originated from other animals sold in that market.

The hypothesis that the 2019-nCoV jumped from an animal at the market is strongly supported by a new publication in the Journal of Medical Virology. The scientists conducted an analysis and compared the genetic sequences of 2019-nCoV and all other known coronaviruses.

The study of the genetic code of 2019-nCoV reveals that the new virus is most closely related to two bat SARS-like coronavirus samples from China, initially suggesting that, like SARS and MERS, the bat might also be the origin of 2019-nCoV. The authors further found that the viral RNA coding sequence of 2019-nCoV spike protein, which forms the "crown" of the virus particle that recognizes the receptor on a host cell, indicates that the bat virus might have mutated before infecting people.

How influenza jumped from animals to humans

But when the researchers performed a more detailed bioinformatics analysis of the sequence of 2019-nCoV, it suggests that this coronavirus might come from snakes.

The Wuhan Huanan Wholesale Seafood Market, where the coronavirus outbreak is believed to have started, is now closed.

From bats to snakes

The researchers used an analysis of the protein codes favored by the new coronavirus and compared it to the protein codes from coronaviruses found in different animal hosts, like birds, snakes, marmots, hedgehogs, manis, bats and humans. Surprisingly, they found that the protein codes in the 2019-nCoV are most similar to those used in snakes.

Snakes often hunt for bats in wild. Reports indicate that snakes were sold in the local seafood market in Wuhan, raising the possibility that the 2019-nCoV might have jumped from the host species -- bats -- to snakes and then to humans at the beginning of this coronavirus outbreak. However, how the virus could adapt to both the cold-blooded and warm-blooded hosts remains a mystery.

The authors of the report and other researchers must verify the origin of the virus through laboratory experiments. Searching for the 2019-nCoV sequence in snakes would be the first thing to do. However, since the outbreak, the seafood market has been disinfected and shut down, which makes it challenging to trace the new virus' source animal.

3 reasons the US is not ready for a pandemic

Sampling viral RNA from animals sold at the market and from wild snakes and bats is needed to confirm the origin of the virus. Nonetheless, the reported findings will also provide insights for developing prevention and treatment protocols.

The 2019-nCoV outbreak is another reminder that people should limit the consumption of wild animals to prevent zoonotic infections.

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## Vocabulary

### Available

##### Adjective

* Suitable or ready for use; of use or service; at hand
* Readily obtainable; accessible
* Having sufficient power or efficacy; valid.
* Archaic. efficacious; profitable; advantageous.

### Coding

##### Noun

* The transforming of a variate into a more convenient variate.

### Commons

##### Adjective,

* Belonging equally to, or shared alike by, two or more or all in question
* Pertaining or belonging equally to an entire community, nation, or culture; public
* Joint; united
* Widespread; general; ordinary

##### Noun

* Often commons. Chiefly New England. a tract of land owned or used jointly by the residents of a community, usually a central square or park in a city or town.
* Law. the right or liberty, in common with other persons, to take profit from the land or waters of another, as by pasturing animals on another's land (common of pasturage) or fishing in another's waters (common of piscary).

### Forms

##### Noun

* External appearance of a clearly defined area, as distinguished from color or material; configuration
* The shape of a thing or person.

##### Verb (used with object)

* To construct or frame.
* To make or produce.

##### Verb (used without object)

* To take or assume form.
* To be formed or produced

### Lower

##### Verb (used with object)

* To cause to descend; let or put down
* To make lower in height or level

##### Verb (used without object)

* To become lower, grow less, or diminish, as in amount, intensity, or degree
* To descend; sink

##### Adjective

* Comparative of low1.
* Of or relating to those portions of a river farthest from the source.

##### Noun

* A denture for the lower jaw.
* A lower berth.

### Microscope

##### Noun

* An optical instrument having a magnifying lens or a combination of lenses for inspecting objects too small to be seen or too small to be seen distinctly and in detail by the unaided eye.
* (initial capital letter) Astronomy. the constellation Microscopium.

### Cloze Questions

##### Fill in the blanks

-: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ -- the Chinese krait and the Chinese cobra \_\_\_\_ \_\_\_\_\_\_ be the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ source of the \_\_\_\_\_\_\_\_\_\_ discovered \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ respiratory illness \_\_\_\_ China \_\_\_\_\_\_\_\_ winter.

-: The many-banded \_\_\_\_\_\_\_\_\_\_ (Bungarus multicinctus), \_\_\_\_\_\_\_\_ known as the Taiwanese krait or \_\_\_\_\_\_ Chinese \_\_\_\_\_\_\_\_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ species \_\_\_\_ elapid snake \_\_\_\_\_\_\_\_\_\_ in much of central \_\_\_\_\_\_ southern \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ Southeast Asia.

-: The illness was \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in late \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ in Wuhan, a major \_\_\_\_\_\_\_\_ in central China, \_\_\_\_\_\_ has been \_\_\_\_\_\_\_\_\_\_\_\_\_\_ spreading. \_\_\_\_\_\_\_\_\_\_ then, sick travelers \_\_\_\_\_\_\_\_ Wuhan \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ China and other countries, including the United States.

-: \_\_\_\_\_\_\_\_\_\_ samples \_\_\_\_ \_\_\_\_\_\_ virus \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from patients, scientists \_\_\_\_ China have determined \_\_\_\_\_\_ genetic \_\_\_\_\_\_\_\_ of the virus \_\_\_\_\_\_ used microscopes to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it. \_\_\_\_\_\_ pathogen \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ this \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ It's in the same family of viruses \_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ severe \_\_\_\_\_\_\_\_\_\_ respiratory syndrome coronavirus (SARS-CoV) and Middle \_\_\_\_\_\_\_\_ respiratory syndrome coronavirus \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which have killed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of people in \_\_\_\_\_\_ past 17 years. The World Health \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ named \_\_\_\_\_\_ new coronavirus 2019-nCoV.

-: \_\_\_\_ are virologists \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ editors and \_\_\_\_\_\_ closely following this \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because there are many questions that \_\_\_\_\_\_\_\_ to be answered to \_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_ public health threat.

-: \_\_\_\_\_\_ name of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ from its shape, which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a crown \_\_\_\_ solar corona \_\_\_\_\_\_\_\_ imaged using an electron microscope.

-: The electron microscopic image, reveals the \_\_\_\_\_\_\_\_\_\_ shape structural details for \_\_\_\_\_\_\_\_\_\_ the coronavirus was \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ is of the \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ respiratory syndrome coronavirus (MERS-CoV). \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of Allergy and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (NIAID)

-: Coronavirus is transmitted \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the air \_\_\_\_\_\_ primarily infects \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ respiratory and gastrointestinal \_\_\_\_\_\_\_\_\_\_ \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ birds. \_\_\_\_\_\_\_\_\_\_\_\_ most of the members of \_\_\_\_\_\_ coronavirus family only cause \_\_\_\_\_\_\_\_ flu-like symptoms \_\_\_\_\_\_\_\_\_\_\_\_ infection, SARS-CoV and MERS-CoV can \_\_\_\_\_\_\_\_\_\_\_\_ both upper \_\_\_\_\_\_ lower airways and cause \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and other complications \_\_\_\_ humans.

-: \_\_\_\_\_\_\_\_ \_\_\_\_\_\_ 2019-nCoV \_\_\_\_\_\_\_\_\_\_\_\_ similar symptoms to SARS-CoV \_\_\_\_\_\_ MERS-CoV. People \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with \_\_\_\_\_\_\_\_\_\_ coronaviruses suffer a severe inflammatory response.

-: Unfortunately, there \_\_\_\_ \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vaccine or antiviral treatment available for coronavirus infection. A better \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ the \_\_\_\_\_\_\_\_ cycle of 2019-nCoV, including \_\_\_\_\_\_ source of the virus, \_\_\_\_\_\_ it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_ replicates are needed \_\_\_\_ both \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ the disease.

-: Both SARS \_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_ classified \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ diseases, meaning the first \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ who \_\_\_\_\_\_\_\_ infected acquired these viruses directly from animals. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_ possible \_\_\_\_\_\_\_\_\_\_\_\_\_\_ while in the animal host, \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ had acquired a series \_\_\_\_ genetic mutations \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ it to infect and multiply inside humans.

-: \_\_\_\_\_\_ these viruses can \_\_\_\_ transmitted from person \_\_\_\_ person. \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ have revealed that the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ source of SARS-CoV and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is \_\_\_\_\_\_ bat, and that the \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ (a mammal native to \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ camels, respectively, served as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ hosts between \_\_\_\_\_\_\_\_ and humans.

-: In the case of \_\_\_\_\_\_\_\_ 2019 coronavirus outbreak, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ that most \_\_\_\_ the first \_\_\_\_\_\_\_\_\_\_ \_\_\_\_ patients hospitalized \_\_\_\_\_\_\_\_ workers \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at a local seafood \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ market \_\_\_\_\_\_\_\_\_\_ also sold processed meats \_\_\_\_\_\_ live consumable animals including \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ donkeys, sheep, pigs, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ foxes, badgers, bamboo rats, hedgehogs and reptiles. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_ one \_\_\_\_\_\_ ever \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ finding a coronavirus infecting \_\_\_\_\_\_\_\_\_\_\_\_\_\_ animals, it is plausible that the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ may \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_\_\_ animals sold \_\_\_\_ \_\_\_\_\_\_\_\_ market.

-: The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that \_\_\_\_\_\_ 2019-nCoV jumped from \_\_\_\_ animal \_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_ is strongly supported by a new \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_ Journal of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Virology. The scientists conducted an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ 2019-nCoV and all \_\_\_\_\_\_\_\_\_\_ known coronaviruses.

-: The \_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ code of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reveals that \_\_\_\_\_\_ \_\_\_\_\_\_ virus is most \_\_\_\_\_\_\_\_\_\_\_\_\_\_ related to two bat \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ initially suggesting \_\_\_\_\_\_\_\_\_\_ like SARS and \_\_\_\_\_\_\_\_\_\_ the bat \_\_\_\_\_\_\_\_\_\_ also \_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_ of 2019-nCoV. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_ further found that the viral \_\_\_\_\_\_ coding sequence of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ protein, which forms the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_ virus particle that recognizes \_\_\_\_\_\_ receptor \_\_\_\_ a host cell, indicates that the bat virus might have mutated \_\_\_\_\_\_\_\_\_\_\_\_ infecting people.

-: But \_\_\_\_\_\_\_\_ the researchers performed a more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bioinformatics \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ 2019-nCoV, it suggests \_\_\_\_\_\_\_\_ this coronavirus might come from snakes.

-: The \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Market, where \_\_\_\_\_\_ coronavirus outbreak is believed to have started, is \_\_\_\_\_\_ closed.

-: \_\_\_\_\_\_ researchers used \_\_\_\_ analysis \_\_\_\_ \_\_\_\_\_\_ protein codes favored by the \_\_\_\_\_\_ coronavirus and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it to the protein \_\_\_\_\_\_\_\_\_\_ from coronaviruses found \_\_\_\_ different animal \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ birds, snakes, marmots, hedgehogs, manis, bats and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Surprisingly, \_\_\_\_\_\_\_\_ found that \_\_\_\_\_\_ protein \_\_\_\_\_\_\_\_\_\_ in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are most \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ \_\_\_\_\_\_\_\_\_\_ used in snakes.

-: Snakes \_\_\_\_\_\_\_\_\_\_ hunt \_\_\_\_\_\_ bats \_\_\_\_ wild. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ indicate \_\_\_\_\_\_\_\_ snakes were \_\_\_\_\_\_\_\_ \_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ seafood market \_\_\_\_ Wuhan, raising the possibility that the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ might have jumped from \_\_\_\_\_\_ \_\_\_\_\_\_\_\_ species \_\_\_\_ bats -- to snakes and \_\_\_\_\_\_\_\_ to humans \_\_\_\_ \_\_\_\_\_\_ beginning \_\_\_\_ \_\_\_\_\_\_\_\_ coronavirus outbreak. However, \_\_\_\_\_\_ \_\_\_\_\_\_ virus could adapt to both the cold-blooded and warm-blooded hosts remains a mystery.

-: The \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the report \_\_\_\_\_\_ other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ must \_\_\_\_\_\_\_\_\_\_\_\_ the origin of the \_\_\_\_\_\_\_\_\_\_ through laboratory experiments. Searching for the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sequence \_\_\_\_ snakes \_\_\_\_\_\_\_\_\_\_ be the first thing to do. However, \_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ seafood market \_\_\_\_\_\_ \_\_\_\_\_\_\_\_ disinfected and \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ which makes it challenging \_\_\_\_ trace the \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ source animal.

-: 3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ US is \_\_\_\_\_\_ ready for a pandemic

-: Sampling viral RNA from animals \_\_\_\_\_\_\_\_ at \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_ wild snakes and \_\_\_\_\_\_\_\_ \_\_\_\_ needed \_\_\_\_ confirm the origin \_\_\_\_ \_\_\_\_\_\_ virus. Nonetheless, \_\_\_\_\_\_ reported findings will also \_\_\_\_\_\_\_\_\_\_\_\_\_\_ insights \_\_\_\_\_\_ developing prevention and treatment protocols.

-: \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ reminder that people should limit the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_ animals to prevent zoonotic infections.

-: Haitao Guo and Shou-Jiang Gao \_\_\_\_\_\_ professors \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and molecular \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ at the University of Pittsburgh. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ "George" \_\_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ microbiology at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of Alabama at Birmingham.

### Discussion Questions

1: Summarise the article in your own words

2: How do you feel after reading the article?

3: Do you agree with the article's point? Why/why not?

4: Can you come up with an argument against this article's point?

5: After reading the article, is there anything you are wondering about?

6: Does the article relate to something else you read or watched recently?