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## Questions and Answers About Ricin

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(Updated March 5, 2008)

**NOTE:** More information about ricin can be found on the [CDC Ricin Homepage](http://www.bt.cdc.gov/agent/ricin/).  
(/agent/ricin/)



### What is ricin?

Ricin is a poison found naturally in castor beans. If castor beans are chewed and swallowed, the released ricin can cause injury. Ricin can be made from the waste material left over from processing castor beans. It can be made in the form of a powder, a mist, or a pellet, or it can be dissolved in water or weak acid.

### How toxic is ricin? How do people get sick from it?

Ricin is very toxic. It works by getting inside the cells of a person's body and preventing the cells from making the proteins they need. Without the proteins, cells die. Eventually this is harmful to the whole body, and may cause death.

As with most chemicals, whether or not a person becomes ill after exposure to ricin depends on how much ricin the person was exposed to, how long the exposure lasted, what the exposure method was (inhalation, ingestion, or injection), and other factors. In general, when the dose is the same, being exposed to ricin by injection has the greatest potential for causing illness, followed by inhalation, and then ingestion.

The purity of the ricin can also significantly affect the how sick someone becomes. For instance, ricin has greater potential for causing illness if it has been purified by special, technically difficult processes that are not readily available. In addition to the complexities involved in producing ricin that is highly purified, it is also very difficult to produce ricin that retains the physical properties which make it easy to inhale. These are just some examples of the more important factors that can help predict whether or not someone may get sick after being exposed to ricin.

### How might I be exposed to ricin?

You can be exposed to ricin either by ingesting (swallowing) or inhaling (breathing) material containing ricin. In a few rare, past cases, injections of ricin have led to poisoning. This is a very unlikely method of exposure because it requires someone to actually inject the material into you

### What are the signs and symptoms of ricin poisoning?

If ricin is ingested, initial symptoms typically occur in less than 6 -12 hours. These initial symptoms are most likely to affect the gastrointestinal system and include nausea, vomiting and abdominal pain. The symptoms of ricin poisoning are then likely to rapidly progress (generally over 12-24 hours) to include problems such as severe dehydration, and kidney and liver problems. This rapid progression of symptoms and illness is noticeably different than what typically occurs with most (but not all) commonly encountered infectious foodborne illnesses, which generally resolve within a day or two. Nevertheless, it is important to note that ricin is not the only potential cause of such symptoms, other illnesses due to chemicals and non-chemical causes (e.g., infectious) can also present with these signs and may be cause for concern.

If ricin is inhaled, initial symptoms may occur as early as 4-6 hours after exposure, but serious symptoms could also occur as late as 24 hours after exposure. The initial symptoms are likely to affect the respiratory system and can include difficulty breathing, shortness of breath, chest tightness, and cough. The symptoms of ricin poisoning are then likely to rapidly progress (generally over 12-24 hours) to include problems such as worsening respiratory symptoms, pulmonary edema (fluid within the lungs), and eventually, respiratory failure. This rapid progression of symptoms and illness is noticeably different than what typically occurs with most common colds and cough-type illnesses. Nevertheless, it is important to note that ricin is not the only potential cause of such symptoms, other illnesses due to chemicals and non-chemical causes (e.g., infectious) can also present with these signs and may be cause for concern.

Death from ricin poisoning can take place within 36 to 72 hours of exposure, depending on the route of exposure (inhalation, ingestion, or injection) and the dose received.

## What should I do if I feel I'm experiencing symptoms of ricin exposure?

Seek medical attention right away.

## Is it true that there's no cure/antidote for ricin? What can be done to help people who have been exposed to ricin? Are treatments available?

It is true that no antidote exists for ricin. Because no antidote exists, the most important factor is avoiding ricin exposure in the first place. If exposure cannot be avoided, the most important factor is then getting the ricin off or out of the body as quickly as possible. Ricin poisoning is treated by giving victims supportive medical care to minimize the effects of the poisoning. The types of supportive medical care would depend on several factors, such as the route by which victims were poisoned (that is, whether poisoning was by inhalation, ingestion, or skin or eye exposure). Care could include such measures as helping victims breathe, giving them intravenous fluids (fluids given through a needle inserted into a vein), giving them medications to treat conditions such as seizure and low blood pressure, flushing their stomachs with activated charcoal (if the ricin has been very recently ingested), or washing out their eyes with water if their eyes are irritated.

## How are anthrax and ricin similar or different?

Anthrax is the spore form of a bacterium (an organism) that can be dried, purified, and made into a powder that can be inhaled (breathed in). After anthrax spores are inhaled, they can become active, reproduce in the body, and cause disease. This process takes at least 24 hours but usually several days. However, the spore can stay in the body for weeks before becoming active and causing illness, which is why antibiotics to prevent anthrax are given for a long period (60 days) after a person has been exposed.

Ricin is a poison found naturally in castor beans. Ricin can be made from the waste material left over from processing castor beans and then purified, and treated to form a powder that can be inhaled although this is a very technically difficult and complicated process. Most ricin poisonings have occurred when the ricin was injected or when the person swallowed the ricin. Symptoms of ricin poisoning are most likely to occur within 4 to 12 hours if the ricin was inhaled or swallowed.

## Is ricin poisoning contagious?

No, ricin poisoning is not contagious. It cannot spread from person to person through casual contact.

## Can ricin be "aerosolized" like anthrax?

Yes, ricin in the form of a fine powder can be suspended in air.

## Has anyone ever died after being exposed to ricin?

Yes, several deaths have resulted after a victim was injected with ricin. People have been poisoned with ricin after eating castor beans, but most cases of eating castor beans do not result in poisoning, because it is difficult to release the ricin from castor beans. Also, ricin is not as well absorbed through the gastrointestinal tract when compared to injection or inhalation.

## Where can I find general information about ricin?

See the [ricin fact sheet \(/agent/ricin/facts.asp\)](/agent/ricin/facts.asp).

## Where can I find general information about ricin in Spanish?

See the [ricin fact sheet in Spanish \(/agent/ricin/espanol/facts.asp\)](/agent/ricin/espanol/facts.asp).

## Is there a TTY phone line available where I can get information about ricin?

Yes, you can call the CDC TTY phone line at 888-232-6348.

## What form is ricin found in? Is it a powder?

Ricin can be in the form of a powder, a mist, or a pellet, or it can be dissolved in water or weak acid (from the [ricin fact sheet \(/agent/ricin/facts.asp\)](/agent/ricin/facts.asp)).

## Will the irradiation equipment used by the postal service have any effect on ricin?

Postal irradiation may have some effect, but CDC still considers ricin to be fully functional and just as dangerous even after irradiation.

## Where can I find information about personal protective equipment and cleanup for ricin?

See the [National Institute for Occupational Safety and Health emergency response card \(http://www.cdc.gov/NIOSH/ersbdb/EmergencyResponseCard\\_29750002.html\)](http://www.cdc.gov/NIOSH/ersbdb/EmergencyResponseCard_29750002.html).

## If I was present where ricin was located, could I have carried it home? Is my house safe?

If ricin was released into the air, some ricin might have gotten onto the clothing of people who were present and might have then been transported on the clothing to their homes. The likelihood is very low in this instance that enough ricin would have gotten onto your clothing and would have been transported home with you for your health to be threatened. However, any exposed clothing should be handled according to the general guidelines given in the [“Personal Cleaning and Disposal of Contaminated Clothes” guidelines \(/planning/personalcleaningfacts.asp\)](/planning/personalcleaningfacts.asp).

## How do I know my family is safe?

Ricin poisoning is not contagious. People who were not present where the ricin was found are not likely to have been exposed at levels high enough to negatively affect their health.

## What are the long-term effects of ricin exposure?

No long-term direct effects are known to exist from ricin exposure that did not result in symptoms. Following severe ricin poisoning, the damage done to vital organs may be permanent or have lasting effects.

## Are certain populations more vulnerable to the health effects of ricin exposure, such as children, pregnant women, the elderly, people who are immunocompromised, or people with respiratory or gastrointestinal (GI) tract illnesses?

Although it is unknown whether these populations are at higher risk, the possibility of higher risk does exist. People who have existing illnesses of the respiratory or GI tract may have pre-existing tissue irritation or damage as a result of their illness. If this damaged or irritated tissue is exposed to ricin, the result may be further injury and greater absorption of the ricin toxin.

## Is it possible that health effects may not occur until more than 72 hours after exposure to ricin?

The information that exists on ricin poisoning in humans is extremely limited. Much of what we know about ricin poisoning comes from animal studies and only a few human cases. Nevertheless, enough information exists on ricin poisoning by ingestion (swallowing) to say that it is extremely unlikely that the onset of signs and symptoms of ricin poisoning by ingestion would occur more than 10 hours after exposure. Much less information exists on ricin poisoning by inhalation (breathing in ricin), but initial poisoning symptoms are very unlikely to begin more than 24 hours after exposure.

## What will happen to personal belongings exposed to ricin?

Personal belongings should be handled according to the [“Personal Cleaning and Disposal of Contaminated Clothes” guidelines](http://www.bt.cdc.gov/agent/ricin/qa.asp#personalcleaning) ([/planning/personalcleaningfacts.asp](http://www.bt.cdc.gov/agent/ricin/qa.asp#personalcleaningfacts)).

## What if an event involving ricin happens again?

If there is another event involving ricin, the necessary steps to protect the public’s health and assess for building contamination will be repeated.

## What tests are used to detect ricin?

There are several tests used to detect ricin, including tests for environmental samples of suspicious materials, and for clinical specimens from human body fluids. Public health laboratories that are part of CDC’s Laboratory Response Network (LRN) use rapid detection tests for environmental samples. Some LRN laboratories can test clinical urine samples for the presence of ricinine, an indicator of ricin exposure.

## What do the results of these tests tell us?

The rapid tests indicate whether components of the castor bean are present in the environmental sample and whether ricin toxin is present. If both of these tests yield a “positive,” then the presence of ricin can be confirmed.

Another assay for environmental samples measures the activity of the ricin toxin, since ricin toxicity can be affected by several factors including temperature. The toxin activity test tells officials whether the toxin is still dangerous.

The presence of ricinine in urine helps to establish whether ricin exposure has occurred, and may help estimate the degree of exposure if the time of exposure is known.

## How long does it take for these tests to yield results?

The rapid detection tests used by the LRN can be completed within 6-8 hours after receipt of samples. The toxin activity test takes about 48 hours to perform but the availability of cultured cells used in the test may delay testing.

For a clinical urine specimen, measurement of ricinine can be completed within several hours after the samples are received.

## What is the difference between a preliminary test and a confirmatory test?

A preliminary test result – such as a positive for ricin components – must be confirmed by a second LRN test, which detects ricin toxin. The ricin toxin test is considered the best test for determining the presence of ricin. A positive result for ricin components can be used in public health decision making while officials wait for confirmatory results from the ricin toxin test.

NOTE: These Q & As are based on CDC’s best current information. They may be updated as new information becomes available.

## Related Links

- [Facts About Ricin \(/agent/ricin/facts.asp\)](/agent/ricin/facts.asp)
  - [CDC Ricin Homepage \(/agent/ricin/\)](/agent/ricin/)
  - Page last updated March 5, 2008
  - Content source: National Center for Environmental Health (NCEH) (<http://www.cdc.gov/nceh/>) / Agency for Toxic Substances and Disease Registry (ATSDR) (<http://www.atsdr.cdc.gov/>) , National Center for Injury and Violence Prevention and Control (NCIPC) (<http://www.cdc.gov/injury/>)
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