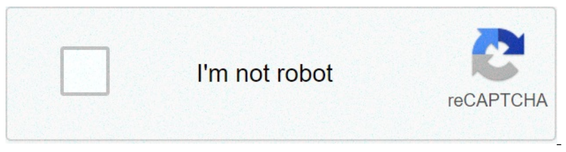

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What does the number after isotopes of nitrogen

A radionuclide scan is a way of imaging bones, organs and other parts of the body by using a small dose of a radioactive chemical. There are different types of radionuclide chemical. The one used depends on which organ or part of the body is to be scanned.Note: the information below is a general guide only. The arrangements, and the way tests are performed, may vary between different hospitals. Always follow the instructions given by your doctor or local hospital.A radionuclide scan may be done for all sorts of reasons. For example:There are various other types of radionuclide tests.The preparation needed is usually very little. It will depend on which type of scan you are having. Your local hospital should give you specific information to help you prepare for these tests.For some types of scan, you may be asked to have lots to drink to help to flush the radionuclide through your body.For some types of scan you may also be asked to empty your bladder of urine before the scanning begins.For some scans, such as thyroid scans, you may be instructed to stop certain medications for some time before the scan.As these tests involve a small amount of radiation, pregnant women should not have them.Note: let your doctor know if you are, or think you could be, pregnant. You should also let your doctor know if you are breastfeeding.The procedures for the different types of radionuclide scans are different. Information about your scan should be sent to you with the appointment.Depending on the type of scan you have, you usually either swallow a small quantity of radionuclide, or it is injected into a vein in your arm. It then takes some time - sometimes several hours (depending on what is being scanned) - for the radionuclide to travel to the target organ or tissue, and to be 'taken' into the active cells. So, after receiving the radionuclide you may have a wait of a few hours. You may be able to go out and come back to the scanning room later in the day.When it is time to do the scanning, you usually lie on a couch while the gamma camera detects the gamma rays coming from your body.By Arturo 1299 (Own work) via Wikimedia CommonsThe computer turns the information into a picture. You need to lie as still as possible whilst each picture is taken (so it is not blurred). Some pictures can take 20 minutes or more to expose.The number of pictures taken and the time interval between each picture vary depending on what is being scanned. Sometimes only one picture is needed. However, for some scans (such as bone scans or heart scans), two or more pictures are needed. Each picture may be taken several hours apart. So, the whole process can take several hours.Radionuclide scans do not generally cause any side-effects.Uncommon side-effects from radionuclides may include flushing, racing heart and nausea but these are short-lived because they are flushed out of your system quickly.Through the natural process of radioactive decay, the small amount of radioactive chemical in your body will lose its radioactivity over time. It may also pass out of your body through your urine or poo during the first few hours or days following the test.You may be instructed to take special precautions after urinating, to flush the toilet twice and to wash your hands thoroughly. You may be advised to drink plenty of water to help flush the chemicals out of your system.If you have contact with children or pregnant women you should let your doctor know. Although the levels of radiation used in the scan are small, they may advise special precautions. Your hospital should give you more advice on this.The term 'radioactivity' may sound alarming. But, the radioactive chemicals used in radionuclide scans are considered to be safe, and they leave the body quickly in the urine. The dose of radiation that your body receives is very small. In many cases, the level of radiation involved is not much different to a series of a few normal X-rays. However:As with any other types of radiation (such as X-ray), there is a small risk that the gamma rays may affect an unborn child. So, tell your doctor if you are pregnant or if you may be pregnant.Rarely, some people have an allergic reaction to the injected chemical. Tell your doctor if you are allergic to iodine.Theoretically, it is possible to receive an overdose when the chemical is injected. This is very rare.A radionuclide (sometimes called a radioisotope or isotope) is a chemical which emits a type of radioactivity called gamma rays. A tiny amount of radionuclide is put into the body, usually by an injection into a vein. Sometimes it is breathed in, or swallowed, or given as eye drops, depending on the test.There are different types of radionuclides. Different ones tend to collect or concentrate in different organs or tissues. So, the radionuclide used depends on which part of the body is to be scanned. For example, if radioactive iodine is injected into a vein it is quickly taken up into the tissues of the thyroid gland. So, it is used to scan the thyroid gland.Cells which are most 'active' in the target tissue or organ will take up more of the radionuclide. So, active parts of the tissue will emit more gamma rays than less active or inactive parts.Gamma rays are similar to X-rays and are detected by a device called a gamma camera. The gamma rays which are emitted from inside the body are detected by the gamma camera, are converted into an electrical signal and sent to a computer. The computer builds a picture by converting the differing intensities of radioactivity emitted into different colours or shades of grey. This is seen below in a lung perfusion scan.By Myohan (Own work) via Wikimedia CommonsAlternatively areas of the target organ or tissue which emit lots of gamma rays may be shown as red spots ('hot spots') on the picture on the computer monitor. Areas which emit low levels of gamma rays may be shown as blue ('cold spots'). Various other colours may be used for 'in between' levels of gamma rays emitted. Everybody needs nitrogen, but as far as non-negotiable, life-sustaining elements go, it's tricky. Living things require nitrogen for their cells to function and, furthermore, we are virtually steeping in the stuff since our atmosphere is made up of 78 percent nitrogen gas. However, there's a catch: It's a "water, water everywhere, but not a drop to drink" situation.Although nitrogen's lurking basically everywhere, it's not terribly abundant in the Earth's crust, and it's incredibly difficult for living things to capture atmospheric nitrogen and use it for their purposes. It's like having a pocketful of Icelandic krónur in Minneapolis, where you can't spend it."Nitrogen is a major part of amino acids, which are the building blocks of proteins and nucleic acids such as DNA," says Jessie Motes, a Ph.D. candidate in the Odum School of Ecology at the University of Georgia, in an email. "In addition to needing nitrogen for proteins in plants, it is a main component of chlorophyll, which makes it crucial for photosynthesis."The Nitrogen CycleSince nitrogen is a limited resource on this planet, a nitrogen atom doesn't spend much time doing nothing when it's in a form living things can use — scientists call this nitrogen "fixed." Fixed nitrogen is taken up by plants, which are eaten by animals, which eat other animals, which die and decompose and release nitrogen back into the ecosystem to be worked on by bacteria or plants. This is the cycle of a nitrogen atom on Earth, and its journey starts either very quietly or with a humongous bang.Step 1: Nitrogen FixationBelieve it or not, lightning and bacteria are primarily responsible for turning atmospheric nitrogen into nitrogen living things can use. Atmospheric nitrogen (N2) is very stable, so it takes an incredible amount of energy to convert it to a different form. If you've ever wondered why your outdoor plants seem happier after a rain than they do when you turn a sprinkler on them, there's a reason for that: Lightning electrifies atmospheric nitrogen (N2) and water (H2O) to reconfigure them into ammonia (NH3) and nitrates (NO3). This falls to the ground as rain, where plants slurp it up and use it for their biological processes.On the other end of the spectrum, the most common way nitrogen is made available to organisms is when atmospheric nitrogen is fixed by bacteria, some of which live free in the soil and others of which enjoy a symbiotic relationship with certain plant species. Legumes like peas, clover and peanuts have little nodules on their roots that attract bacteria that convert stubborn atmospheric nitrogen into ammonia or ammonium, which can then be used to power the plant.Step 2: NitrificationAmmonia in the soil can be used directly by plants, but it's also the first step in the process of nitrification, through which specialized bacteria and archaea convert ammonia into nitrite (NO2), and then pass it off to an entirely different set of prokaryotes that further oxidize the nitrite into nitrate (NO3-). This process is slow, but it's the way that nitrogen is built as a nutrient in soil and aquatic and marine environments — terrestrial plants, for instance, can absorb ammonium and nitrate through their root hairs. The organisms that specialize in nitrification are also important in treating municipal wastewater.Step 3: AmmonificationEverything living eventually dies, and the nitrogen a particular organism was using when it croaked is taken to hand by bacteria that turn the nitrogen-rich corpse into ammonium, which can be picked back up by plants and used again.Step 4: DenitrificationIt's possible to convert bioavailable nitrogen into atmospheric nitrogen again, and that process is called denitrification. Nitrification is performed by bacteria and archaea that can tolerate oxygen — not all prokaryotes can. In the case of denitrification, certain anaerobic bacteria that don't need oxygen convert nitrate to nitrogen gas, which floats up into the atmosphere and plays hard to get until some lightning or a crafty nitrogen fixing bacterium comes along and ropes it into the nitrogen cycle yet again.Humans and the Nitrogen Cycle"Like most natural processes, anthropogenic activities are disrupting the nitrogen cycle through nitrogen deposition," says Motes. "Too much nitrogen can lead to increased emissions of the greenhouse gas nitrous oxide, as well as eutrophication, which is nitrogen pollution of water sources."