



## Study of virus and differences between DNA and RNA viruses

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**Introduction :** Viruses are infectious biological agents that are completely dependent on the host cell in order to complete their replication process, transcription of the genome, and translation of the mRNA transcripts into proteins. Unlike most living things, the viruses do not have cells. A virus particle is made up of a core of nucleic acid, enclosed in a protein capsule. The virus genome consists of either a DNA (deoxyribonucleic acid) or RNA (ribonucleic acid). Depending on whether they have DNA or RNA genome, viruses are classified into two categories; DNA viruses and RNA viruses. The viral DNA or RNA may be linear or circular and single or double-stranded.

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### DNA vs RNA Viruses

Viruses are communicable agents that cannot replicate without the presence of the host cell. Penetrating the host cell, reproducing and staying away from the defense system of the body are the main survival points of viruses.

DNA or deoxyribonucleic acid is the major storage for genetic codes that contains information for the functioning and advancement of all living organisms. It is found in the nucleus. The sugar present in DNA is deoxyribose and usually it comes with a pair of molecules known as double-stranded molecules with long nucleotide chains. This double-stranded molecule have narrow channel that makes destructive enzymes difficult to penetrate.

In DNA viruses, integration of viral DNA is the same as how host originally would combine DNA. The virus will instill the genetic code specifically to the membrane of the host DNA then with the help of RNA polymerase duplication happens. Replication usually happens in the nucleus. With the formation of the viruses done during lytic phase, the host cell membrane separates and the new viruses were released. Mutation level in DNA is lower because DNA polymerase is having refining activity. They are compelling intracellular parasites and they heartlessly connects with changes taking place in the host. The specificity of the DNA viruses

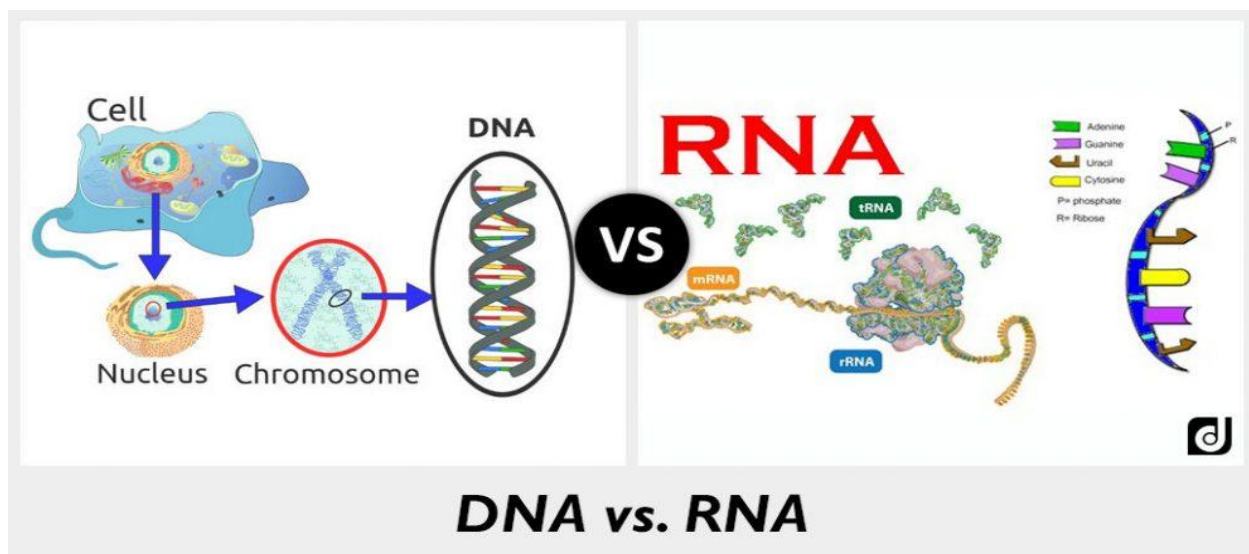


are often concluded at the transcriptional level. These types of viruses are constant that's why vaccines work effectively throughout the years.

RNA or ribonucleic acid is a nucleic polymer acid that performs a significant role in translating the genetic code from the DNA to protein products. It is found in the nucleus and cytoplasm. It is usually a single- stranded molecule with shorter nucleotide chains. The sugar present is ribose. Several RNA viruses instill the RNA to the host cell and skip the DNA host for duplication and decoding. DNA here acts as a pattern for RNA virus then transcribes it into viral proteins. Some RNA viruses embed transcriptase enzyme that transfer RNA virus to DNA virus and combine into the host DNA. Then it follows the DNA replication process. Replication usually happens in the cytoplasm. Mutation is the major cause of changes in the genetic code of the viruses. In RNA mutation is higher because RNA. polymerase is likely to commit errors. They are unstable and replace the protein coat that can bluff the immune system.

### Main Difference

Single-stranded DNA viruses are a great deal less normal than twofold stranded DNA viruses. With RNA viruses, it's the inverse – there is a few case of twofold stranded RNA viruses, yet overwhelmingly they are single-stranded. The pivotal contrast between the two sorts of viruses is in their capacity to orchestrate proteins. While DNA viruses need to interpret DNA into RNA keeping in mind the end goal to have the capacity to integrate proteins, RNA viruses can utilize their own particular viral RNA. RNA infection first adsorbs to the host cell surface. So the





appended infection wires with the endosome film. At last as an aftereffect of a combination of the viral, nucleocapsid is discharged into the cytoplasm. Just opposite to the RNA viruses, the DNA viruses can pass their DNA into the core of the host cell and not into the cytoplasm of the host cell. DNA polymerase compound is utilized as a part of the replication procedure of DNA viruses. Since the DNA polymerase has a refining movement, the change level is lower in DNA viruses. RNA polymerase is utilized as a part of RNA replication procedure of RNA viruses. The transformation level is high in RNA viruses in light of the fact that the RNA polymerase is shaky and can bring about blunders amid the replication. In DNA viruses, there are two stages in the translation procedure in particular early and late interpretation. First, the mRNAs are made (alpha and beta mRNA). Later, gamma mRNAs are made and are interpreted into the cytoplasm. The late stage happens after the DNA replication. These stages can't be recognized in the RNA interpretation process in RNA viruses. RNA viruses interpret mRNAs on host ribosomes and make each of the five viral proteins instantly.

### **DNA Viruses**

The viruses with DNA genome are known as DNA viruses. Some viruses contain either twofold stranded or single-stranded DNA genome. This genome can be direct or divided. These viruses are generally expensive, icosahedral, concealed in lipoproteins, and they don't have polymerase proteins. They are caused by an inactive disease. A few case for DNA viruses are Herpes viruses, poxviruses, hepadna viruses and hepatitis B. Once the twofold stranded DNA is infused into the host cell, it will enter the core of the cell, where the viral DNA can be incorporated into the host cell's DNA genome. At that point, the viral DNA utilizes the cell's polymerase proteins to imitate the viral DNA and begin delivering copies of the infection. One case of such DNA viruses is adenoviruses. Some twofold stranded DNA viruses convey their own particular polymerases; this which permits them to reproduce inside the cytoplasm of the tainted cells, without going into the core and utilizing the cells own particular catalyts. One case of such DNA viruses is poxviruses. These DNA viruses are a great deal less regular the primary class.

### **RNA Viruses**

Viruses with RNA in their genome are named RNA viruses. The RNA viruses can be further named single-stranded RNA viruses and twofold stranded RNA viruses. These are the Single-



stranded RNA viruses that can be further ordered into negative-sense and positive-sense RNA viruses. Controversially, Positive-sense RNA serves straightforwardly as mRNA, yet with a specific end goal to serve as mRNA, negative-sense RNA must utilize RNA polymerase to integrate a reciprocal, positive strand. At the point when RNA viruses attack the human living being, they infuse their RNA into the cytoplasm of the host cell. When they are inside the cytoplasm, RNA can be utilized to integrate proteins, and, in the end, to frame imitation viruses. There is an uncommon classification of RNA viruses, which is well famous with the name of the retroviruses. These viral specialists contain protein referred to in science as converse transcriptase. Once the retrovirus infuses its RNA into the cell, reverse transcriptase translates the RNA into DNA (the operation that is the opposite of typical interpretation). This interpreted viral DNA, once combined, can then be consolidated into the host cell's DNA. At the point when the cell duplicates, and in the end separates, it goes down the viral DNA segment to the recreated cells. One surely understood the case of the retrovirus that can contaminate the human life form is HIV (Human immunodeficiency) infection.

### **Conclusion:**

- The significant distinction between these two sorts is that the RNA viruses have RNA in their genome. The DNA viruses, in contrast, have DNA in their genome.
- RNA replication of RNA viruses more often than not happens in the cytoplasm of the host cell while DNA replication of DNA viruses happens in the core of the host cell.
- DNA viruses are generally twofold stranded while RNA viruses are single-stranded.
- RNA transformation rate is higher than DNA change rate.
- DNA replication happens in the core while RNA replication happens in the cytoplasm.
- DNA viruses are steady while RNA viruses are precarious.
- In DNA viruses, the viral hereditary code is infused in the host DNA for duplication and deciphering. RNA viruses skip DNA for duplication and unraveling.
- Imitate in the core of the cell in the DNA. Translate and reproduce in the cytoplasm of the cell in the RNA.

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