Characteristic of viral genome

virus genomes may contain their genetic information encoded in either DNA or RNA

The nucleic acid comprising the genome may be single stranded or double stranded

It may have a linear, circular, or segmented configuration.

Single-stranded virus genomes may be either positive (+) sense or negative (-) sense

POSITIVE-STRAND RNA VIRUSES

Purified (+)sense virus RNA is directly infectious when applied to susceptible host cells in the absence of any virus proteins.

In addition, RNA genomes tend to have higher mutation rates than those composed of DNA because they are copied less accurately.

This tendency has tended to drive RNA viruses toward smaller genomes.

Picornaviruses

The picornavirus genome consists of one single-stranded, (+)sense RNA molecule.

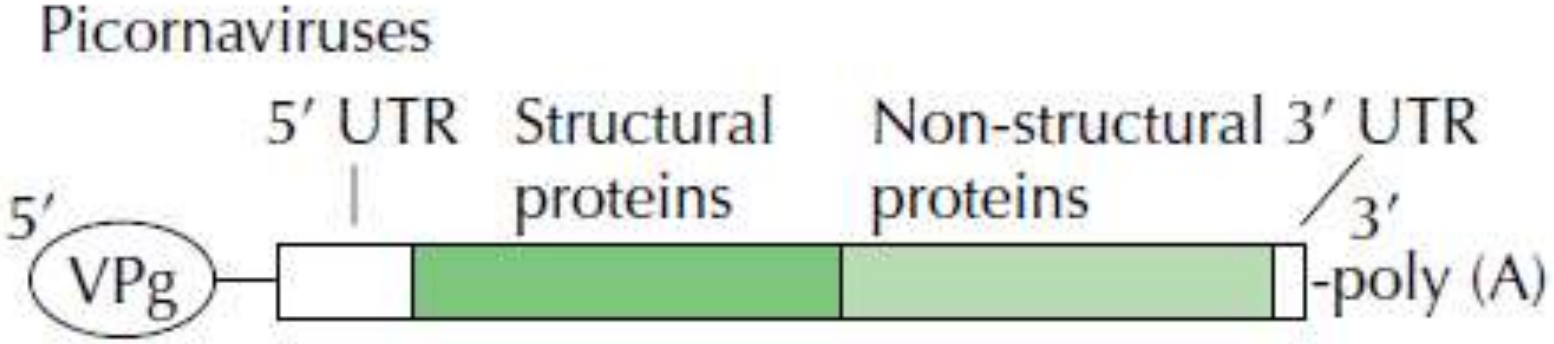
There is a long (600–1200 nt) untranslated region (UTR) at the 5¢ end which is important in translation, virulence, and possibly encapsidation, as well as a shorter 3¢ untranslated region (50–100 nt) that is necessary for (-)strand synthesis during replication.

The 5¢ UTR contains a ‘clover-leaf ’ secondary structure known as the internal ribosomal entry site (**IRES)**

The rest of the genome encodes a single **polyprotein of between 2100 and** 2400 amino acids.

Both ends of the genome are modified—the 5¢ end by a covalently attached small, basic protein VPg (23 amino acids), the 3¢ end by polyadenylation.

Genomic organization of positive-stranded RNA viruses



NEGATIVE-STRAND RNA VIRUSES

Viruses with negative-sense RNA genomes are a little more diverse than the positive- stranded viruses discussed earlier. Possibly because of the difficulties of expression, they tend to have larger genomes encoding more genetic information

None of these genomes is infectious as purified RNA

The(-)sense genome cannot be translated as mRNA without the virus RNA dependent RNA polymerase packaged in each particle