Adeno-Associated Virus - FAQs

What are the Advantages of Gene Delivery by rAAV?

AAV has the capacity to produce high titre virus in dividing and non-dividing cells and the potential for long-term gene transfer with minimum immunogenecity

What is Adeno-associated virus (AAV) and recombinant AAV (rAAV) and helper-free rAAV?

The adeno-associated virus (AAV) is a small, icosahedral and non-enveloped virus that belongs to the Parvoviridae family. A helper virus, such as Adenovirus or Herpes virus is usually required for a productive infection to occur. AAV does not encode its own polymerase so its replication process relies on host cell polymerase activities.

Recombinant AAV is artificial AAV without any AAV rep or cap genes which encode viral replication and structual proteins, respectively. In rAAV, rep and cap are replaced with a gene or construct of interest flanked by the ITRs for replication and packaging. Efficient packaging of rAAV can be performed with constructs ranging from 4.1kb to 4.9kb in size.

Because AAV is a replication-deficient virus, its replication depends on other helper viruses such as adenovirus and herpes virus.

What's the Biosafety requirement for using AAV?

Recombinant AAV constructs that encode no tumourigenic gene and are produced in the absence of a helper virus can be handled in a Biosafety Level 1 (BSL-1) facility. Otherwise, it should be handled as biohazardous material under Biosafety Level 2 (BSL-2) containment.

Is the recombinant AAV safe?

To date, AAV is not linked to any human disease. For wild type AAV, replication is at an extremely low efficiency without the presence of a helper virus, like adenovirus. The recombinant AAV (rAAV) is composed of several plasmids (cis plasmid, Helper plasmid, rep/cap plasmid). The cis plasmid and helper plasmid do not share any regions of homology with the rep/cap gene-containing plasmid; this means the likelihood of a recombinant AAV being able to replicate is theoretically impossible.

What's the cloning capacity for recombinant AAV

AAV has a packaging capacity of around 4.7Kb. When the length of the DNA inserted between the two ITRs is close to the maximal allowed, 4.7Kb, the packaging efficiency decreases significantly. For instance, for gene over-expression from cDNA, since the CMV-poly(A) signal element is about 1Kb, the maximum allowable cDNA length is about 3.2Kb. Whereas if GFP co-expression (about 0.8Kb) is considered, the allowable capacity is about 2.4Kb.

What AAV serotype do you provide and which should I use for my experiment?

We currently provide AAV serotype AAV1, AAV2, AAV5, AAV6, AAV7, AAV8 & AAV9. Please see the guide below to determine which is the best for you.

Cell Line	AAV-1	AAV-2	AAV-5	AAV-6	AAV-8	AAV-9
Huh-7	13	100	0.1	10	0.7	0.0
HEK293	25	100	0.1	5	0.7	0.1
HeLa	3	100	6.7	1	0.2	0.1
HepG2	3	100	1.7	5	0.3	ND
Hep1A	20	100	0.1	1	0.2	0.0
911	17	100	0.1	17	0.1	ND
CHO	100	100	333	50	10	1.0
COS	33	100	5.0	14	2.0	0.5
MeWo	10	100	6.7	10	1.0	0.2
NIH3T3	10	100	0.3	10	0.3	ND
A549	14	100	0.5	10	0.5	0.1
HT1180	20	100	0.3	33	0.5	0.1
Monocytes	1111	100	125	1429	ND	ND
Immature DC	2500	100	222	2857	ND	ND
Mature DC	2222	100	333	3333	ND	ND

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