IMMUNE ATTACKS ON VIRAL VECTORS

Adeno-associated viruses (AAVs) are a popular choice to deliver DNA for gene therapies. But because these are commonly occurring viruses, some 70 percent of adults already carry antibodies and memory T cells that recognize them. These antibodies can neutralize a virus and block it from infecting cells, while also marking it for destruction by macrophages. Weeks after exposure, an immune system that has previously been exposed to an AAV can launch a second attack on AAVs that have entered cells, where the viral capsid is degraded to release its therapeutic DNA payload. Proteins from the capsid are broken down and shuttled to a protein complex on the cell's surface, where pieces of the capsid are displayed and recognized as foreign by circulating T cells.

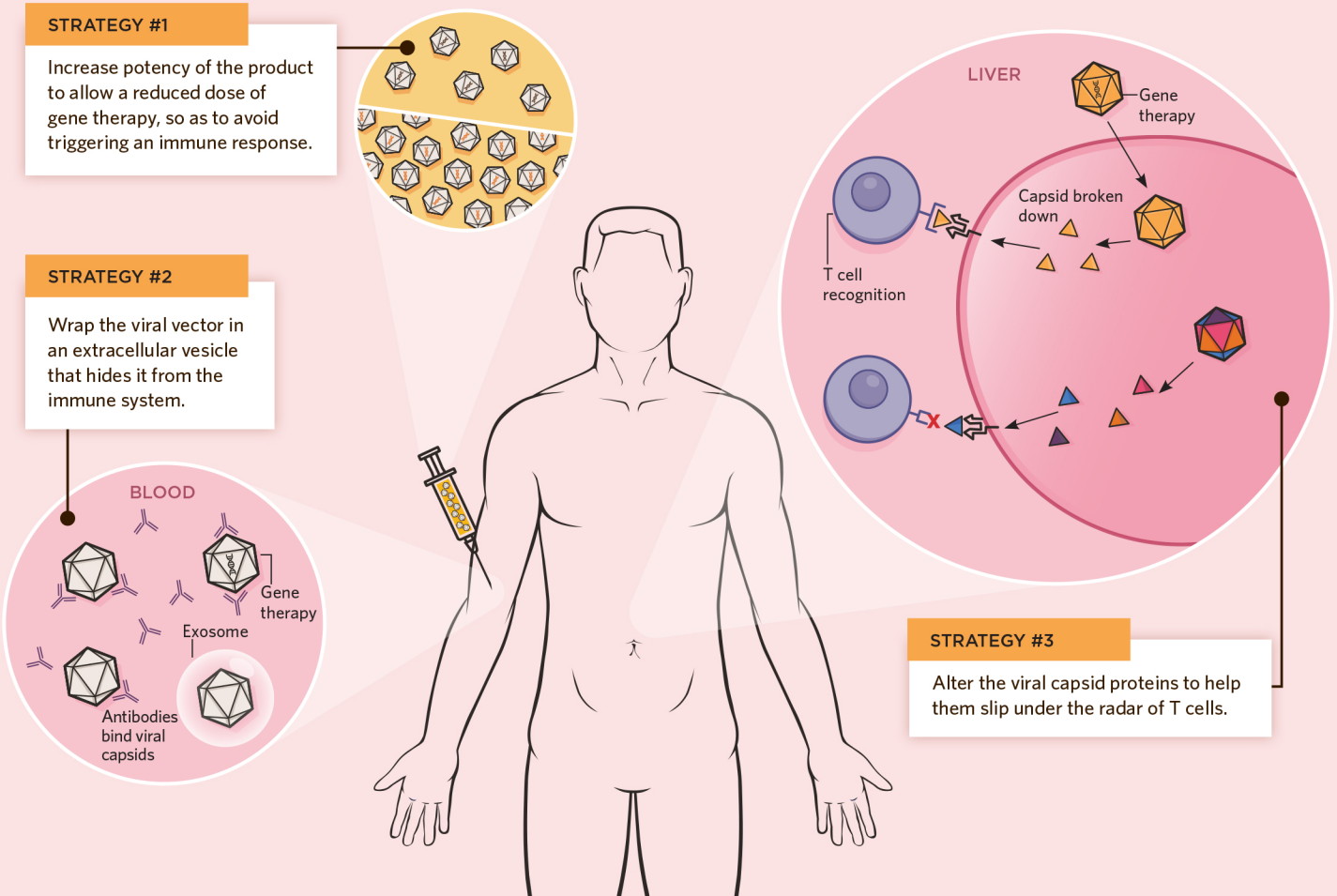
To avoid these immune attacks, which can limit the effectiveness of gene therapies, researchers are exploring several strategies:

STRATEGY #1

Increase potency of the product to allow a reduced dose of gene therapy, so as to avoid triggering an immune response.

STRATEGY #2

Wrap the viral vector in an extracellular vesicle that hides it from the immune system.



STRATEGY #3

Alter the viral capsid proteins to help them slip under the radar of T cells.

THE SCIENTIST STAFF