Video Article

Somatic brain transgenesis by intracerebroventricular AAV injection into early postnatal mice

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Abstract

Recombinant adeno-associated viral vectors (rAAV) transduce non-dividing cells with high efficiency, are intrinsically non-pathogenic, and cause no inflammatory reaction in the host. When delivered into the lateral ventricle of newborn mice less then 24 hours old, rAAV2/1 infects neurons throughout the brain resulting in stable transgene expression for the lifetime of the animal. We refer to this technique as “somatic brain transgenesis” (SBT). Expression is largely restricted to neurons, though other cells in the choroid plexus and ependymal lining of the ventricle are efficiently transduced. The injections can be performed free-hand on cryo-anesthetized pups, making this technique both cost- and time-effective compared to conventional germline transgenics. Viral transgene expression is particularly strong in regions of the hippocampus and forebrain, but can also be found in olfactory bulb and cerebellum. By limiting expression to the brain after neurogenesis is largely complete, this technique avoids complications found with embryonic or peripheral expression of some transgenes. Titer, serotype, transgene promoter, and timing of delivery all influence the transgene expression. Herein, we describe the basic methodology and ways to rapidly optimize the technique to best suit the experimental design. SBT offers rapid screening of transgenic constructs at minimal cost and can be easily mastered following nominal training using readily-available laboratory tools.

Disclosures

No conflicts of interest declared.