

Enhanced gene targeting of adult and pluripotent stem cells using evolved adeno-associated virus.

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Public Summary:

Efficient approaches for the precise genetic engineering of stem cells can enhance both basic and applied stem cell research. Adeno-associated virus (AAV) vectors have demonstrated high-efficiency gene delivery and gene targeting to numerous cell types, and AAV vectors developed specifically for gene delivery to stem cells have further increased gene targeting frequency compared to plasmid construct techniques. This chapter details the production and purification techniques necessary to generate adeno-associated viral vectors for use in high-efficiency gene targeting of adult or pluripotent stem cell applications. Culture conditions used to achieve high gene targeting frequencies in rat neural stem cells and human pluripotent stem cells are also described.

Scientific Abstract:

Efficient approaches for the precise genetic engineering of stem cells can enhance both basic and applied stem cell research. Adeno-associated virus (AAV) vectors have demonstrated high-efficiency gene delivery and gene targeting to numerous cell types, and AAV vectors developed specifically for gene delivery to stem cells have further increased gene targeting frequency compared to plasmid construct techniques. This chapter details the production and purification techniques necessary to generate adeno-associated viral vectors for use in high-efficiency gene targeting of adult or pluripotent stem cell applications. Culture conditions used to achieve high gene targeting frequencies in rat neural stem cells and human pluripotent stem cells are also described.

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