

Pilot Analysis of NINDS Gene Therapy Portfolio

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INTRODUCTION

Gene therapy research is undergoing a renaissance, with recent clinical trial successes after many failures and safety issues. As a result of this resurgence, interest in gene therapy is increasing with several academic and medical centers developing entire centers devoted to gene therapy and its applications. NINDS was interested in examining the distribution of its gene therapy research portfolio across institutions such as these, specifically whether NINDS funds were concentrated in a small number of institutions, as well as determining the state of progress in moving gene therapies in these awards towards clinical readiness (i.e., trials in humans). To address these questions as well as the distribution of awards across disorders, we conducted an in-depth pilot analysis of the NINDS gene therapy portfolio for a single fiscal year, 2012.

METHODS

We utilized QVR to search and download NINDS primary and secondary projects active in 2012 that included the RCDC categories "Gene Therapy" and "Gene Therapy Clinical Trials." Award abstracts and aims were then screened against the inclusion/exclusion criteria described below. For the purposes of this analysis, we defined gene therapy as any project where a transgene is delivered for therapeutic purposes. This includes cells transduced *ex vivo* and then re-implanted, as well as RNAi-based approaches. Projects where a transgene was delivered without therapeutic intent and projects utilizing oncolytic viral therapies were excluded. A total of 42 awards met these criteria and were included in this analysis.



FIGURE 1 - Distribution of Portfolio across Disease Categories

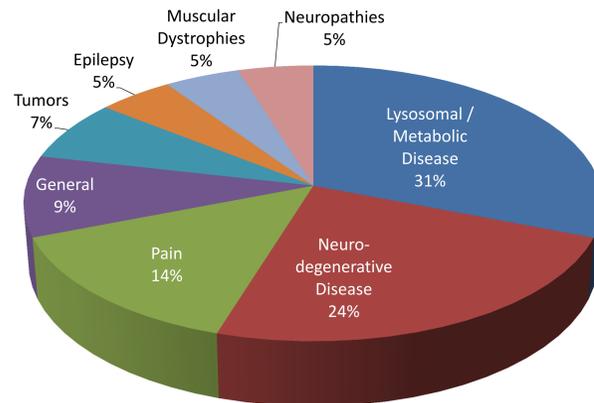


FIGURE 2 - Distribution of Awards across Institutions

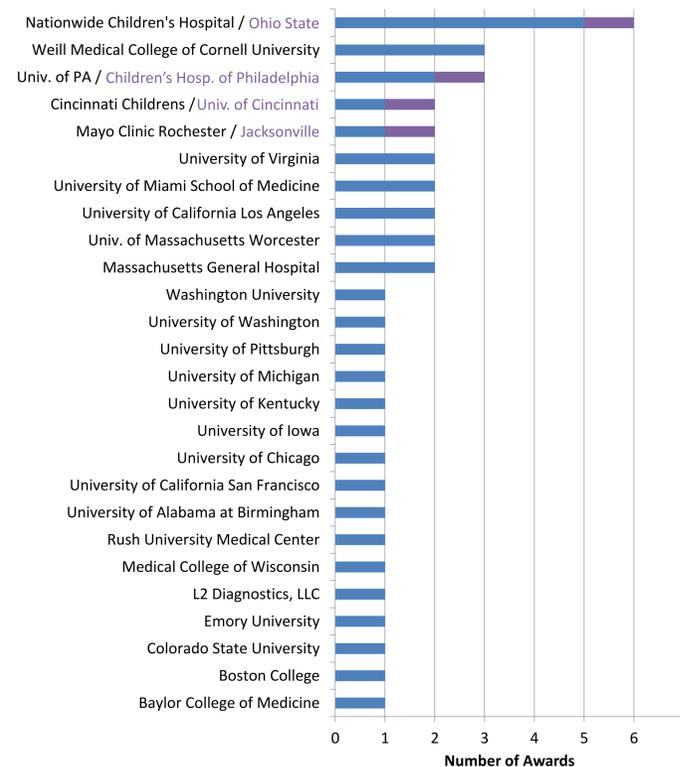
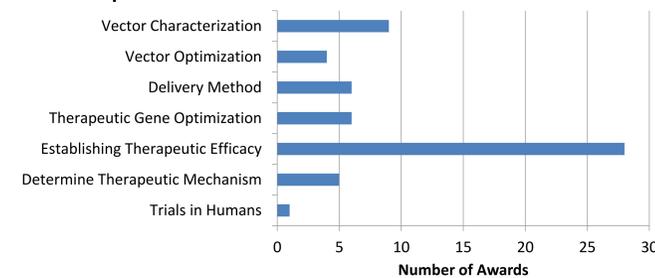


FIGURE 3 - Stage of Gene Therapy Development



Stage of Development	Definition
Vector Characterization	Comparing different viral serotypes, determining tropism
Vector Optimization	Engineering new vectors or enhancing capabilities of existing vectors
Delivery Method	Comparing different delivery routes and methods
Therapeutic Gene Optimization	Comparing different promoters or therapeutic gene constructs
Establishing Therapeutic Efficacy	In animal models
Determine Therapeutic Mechanism	Elucidating mechanism of therapeutic effect
Trials in Humans	Evaluating safety and efficacy in human patients

FIGURE 4 - Vectors Used in Awards

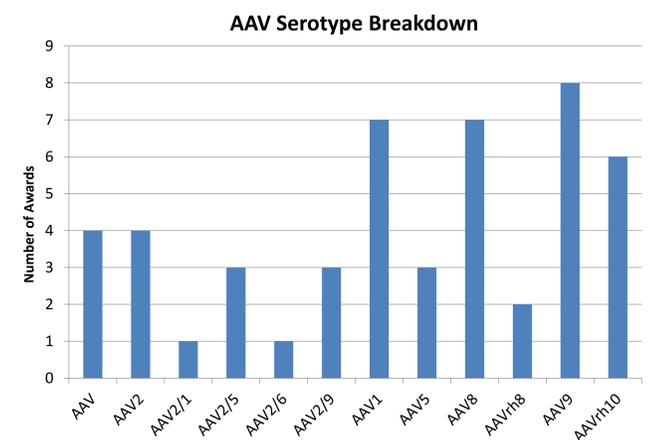
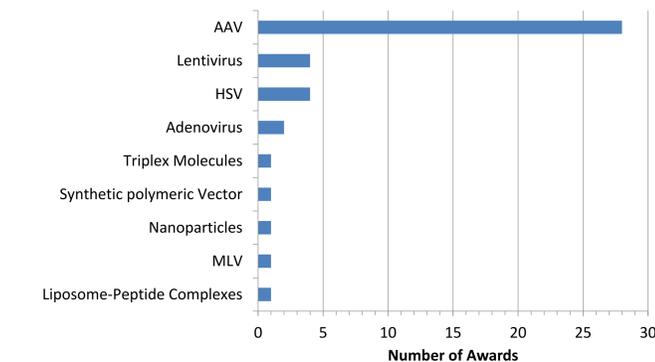
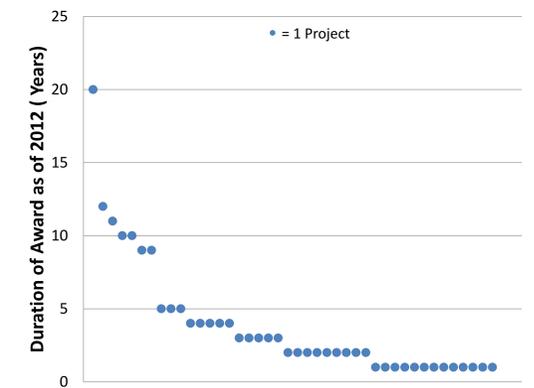


FIGURE 5 - Duration of Awards



SUMMARY

- FY12 NINDS Gene therapy portfolio was concentrated in monogenic and neurodegenerative disorders as well as pain-related topics
- 3 institutions (top 10%) housed nearly 30% of all awards analyzed
- Majority of awards included a component of establishing therapeutic efficacy
- AAV vectors were used almost exclusively and skewed towards serotypes reported to be more effective at transducing CNS tissue
- 83% (35/42) of projects are at or within 5 years of initial award
- ~14% of grantees had at least 1 other active gene therapy award in FY12, and 80% proposed to use the same vector

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