AMERICAN SOCIETY of GENE & CELL THERAPY

555 East Wells Street, Suite 1100
Milwaukee, WI 53202-3823
Phone (414) 278-1341
Fax (414) 276-3349
www.asgct.org | info@asgct.org

Outside Witness Testimony for Fiscal Year 2019 Appropriations
Submitted by the American Society of Gene & Cell Therapy
Prepared for the Subcommittee on Labor, Health and Human Services, Education, and Related Agencies
Regarding appropriations for the US Department of Health and Human Services, National Institutes of Health

May 31, 2018

The Honorable Roy Blunt
Chairman, Labor, Health and Human Services, Education, and Related Agencies
United States Senate
260 Russell Senate Office Building
Washington, DC 20510

The Honorable Patty Murray
Ranking Member, Labor, Health and Human Services, Education, and Related Agencies
United States Senate
154 Russell Senate Office Building
Washington, DC 20510

Dear Chairman Blunt, Ranking Member Murray, and Subcommittee Members:

Thank you for the opportunity to provide this testimony on behalf of the American Society of Gene & Cell Therapy (ASGCT). ASGCT is a membership organization consisting of scientists, physicians, and other professionals involved in the gene and cell therapy fields in settings such as universities, hospitals, government agencies, foundations, and biotechnology and pharmaceutical companies.

The Society respectfully requests robust FY2019 appropriations to the National Institutes of Health to fund additional gene and cell therapy research. Funding further gene and cell therapy research has the potential to accelerate the discovery and clinical application of more safe, effective, innovative genetic and cellular therapies to alleviate and ease human disease, which is a core component of the mission of ASGCT.

Significance of NIH Research Funding for Gene and Cell Therapy

NIH funding is crucial to support basic research on biological targets as well as applied research on new molecular entities, which both contribute to new therapeutic approvals.[1] NIH funding contributed to published research associated with every one of the 210 new drugs approved by the Food and Drug Administration from 2010 – 2016.[1] The development of new therapeutics therefore relies upon this investment, which could expedite the progression of the gene and cell therapies in the pipeline to treat multiple diseases.

[1]Cleary, E.G., Beierlein, J.M., Khanuja, N.S., McNamee, L.M., Ledley, F.D. (2018). Contribution of NIH funding to new drug approvals. In Snyder, S. H. (Ed.) *Proceedings of the National Academy of Sciences, 201715368,* doi: 10.1073/pnas.1715368115.

The gene and cell therapy fields have reached a turning point over the past year that illustrates the contribution of NIH funding to the development of life-altering treatments. For example, the December 2017 FDA approval of voretigene neparvovec (Luxturna) began with the discovery of the *RPE65* gene at the National Eye Institute.[2] This intramural NIH funding provided necessary baseline information for further research that led to the development of the gene therapy to treat the mutations in both copies of that gene, which cause a rare inherited retinal disorder that nearly always progresses to complete blindness. In Phase III clinical trials for this gene therapy, 93 percent of all treated participants saw a gain of functional vision, as assessed by a mobility test, over the follow-up period of at least one year from administration of Luxturna to each eye.[3] Some patients reported putting away their navigational canes and seeing facial expressions for the first time following treatment.[2]

Similarly, two CAR (chimeric antigen receptor) T-cell therapies were approved over the past year for certain forms of leukemia and lymphoma. CAR T-cell therapy is a genetically-modified cell therapy in which a gene is added to a patient's T cells (a type of immune cell) in a laboratory, which enables these cells to recognize and attack cancer cells when multiplied and infused back into the patient.[4] This advance was made possible with robust federal investment in cancer research.[5] The first clinical trial of CAR T-cell therapy in children with acute lymphoblastic leukemia (ALL) was funded in part by grants from the National Cancer Institute (NCI) of the NIH, and researchers at the NCI were the first to report on the potential of CAR T-cell therapy for multiple myeloma.[5] These discoveries are the result of decades of prior research on immunology and cancer biology, much of which was supported by federal funding.[5]

CAR T-cell therapies are now providing hope of effective treatment for patients with certain types of ALL and lymphoma that are resistant to other treatment or have had two or more relapses. For example, tisagenlecleucel (Kymriah) is providing an overall survival rate of 76 percent one year after treatment for children and young adults with certain forms of relapsed or refractory ALL.[6] Long-term survival of these patients without this treatment—with standard chemotherapy and stem cell transplantation—is approximately 5 percent.[7]

---

[2]Shaberman , B. A. (2017). Retinal research nonprofit paves the way for commercializing gene therapies. *Human Gene Therapy 28*(12), 1118-1121.

[3]Spark Therapeutics, Inc. (November 10, 2017). Three-year follow-up phase 3 data provide additional information on efficacy, durability and safety of investigational LUXTURNA™ (voretigene neparvovec) in patients with biallelic RPE65-mediated inherited retinal disease [Press release]. Retrieved from http://ir.sparktx.com/news-releases/news-release-details/three-year-follow-phase-3-data-provide-additional-information.

[4]NCI Dictionary of Cancer Terms. Retrieved from www.cancer.gov/publications/dictionaries/cancer-terms/def/car-t-cell-therapy.

[5]Heymach, J., Krilov, L., Alberg, A., Baxer, N.,Chang, S. M., Corcoran, R., … Burstein, H. Clinical Cancer Advances 2018: Annual Report on Progress Against Cancer From the American Society of Clinical Oncology. *Journal of Clinical Oncology 2018 36*(10), 1020-1044.

[6]Maude, S., Laetsch, T., Buechner, J., Rives, S., Boyer, M., Bittencourt, H., … Baruchel, A. (2018). Tisagenlecleucel in children and young adults with B-cell lymphoblastic leukemia. *N Engl J Med 378,* 439-448.

[7]Queudeville, M, Handgretinger, R, Ebinger, M. (2017). Immunotargeting relapsed or refractory precursor B-cell acute lymphoblastic leukemia – role of blinatumomab. *Onco Targets Ther 10*, 3567-3578

In addition to its direct contributions to gene therapy-related research, NIH-funded basic research is estimated to provide a positive return to public investment of 43 percent.[5] Studies show that NIH investments in biomedical research stimulate increased private investment, with every dollar of increase in public clinical research stimulating $2.35 of industry investment at 3 years.[5] This economic stimulation is even higher for gene-related research, with a federal investment of $3.8 billion in the Human Genome Project from 1988 to 2003 helping to drive $796 billion in economic output, which is a return of $141 for every $1 invested.[8]

Need for Additional Gene and Cell Therapy Research

The approvals in 2017 of a gene therapy and two gene-modified cell therapies exemplify the vast medical progress that NIH research has contributed to in these areas. However, considerable additional scientific study will be necessary for gene and cell therapies to reach their potential to transform the lives of patients with multiple additional diseases. Many of the diseases for which gene therapy offers great promise are rare inherited disorders. Of the 7,000 rare diseases that exist, 95 percent have no current treatment.[9]

Continued strong funding for multiple institutes and centers of the NIH can support gene and cell therapy research to address this immense unmet need and the resulting human and economic costs of diseases such as sickle cell disease, hemophilia, and muscular dystrophy that collectively impact the lives of 10 percent of the US population.[8] Children with some hereditary diseases cannot walk, or even breathe or swallow on their own. Tragically, many of these children die young or become severely disabled by adolescence. For diseases with longer life expectancy, such as sickle cell disease and hemophilia, patients face a lifetime of intensive and expensive medical care. For example, the average lifetime cost of treating hemophilia for a lifetime is approximately $12 million.[10] To develop potentially durable, often one-time gene therapy treatments for these diseases will require significant research funding to ease or potentially end the human suffering, and in some cases the high current medical costs, that they currently incur.

Since gene and cell therapies are types of regenerative medicine, ASGCT is grateful for the funding authorized by the 21st Century Cures Act for the Regenerative Medicine Innovation Project (RMIP). The Society requests that the $10 million authorized by the Cures Act for FY2019 is appropriated specifically for this initiative, in addition to generous general NIH appropriations. Appropriations of a total of $12 million in FY2017 and FY 2018 for RMIP are greatly appreciated. Initial FY2017 funds supported eight research project awards. The Society also appreciates the $2.2 billion increase from FY2018 that the Senate Appropriations Committee has adopted in 302(b) allocations to the Labor, Health and Human Services, Education, and Related Agencies Department, compared to the flat appropriations level adopted by the House of Representatives. ASGCT encourages retention of at least this level of appropriations to enable sufficient NIH funding for FY2019.

---

[8]Accelerating Biomedical Research Act, H.R. 5455, 115th Cong. (2018).

[9]Institute of Medicine (US) Committee on Accelerating Rare Diseases Research and Orphan Product Development; Field, M.J., & Boat, T.F., editors. Rare Diseases and Orphan Products: Accelerating Research and Development. Washington (DC): National Academies Press (US); 2010. Available from www.ncbi.nlm.nih.gov/books/NBK56189. doi: 10.17226/12953.

[10]Chen, S.L. (2016). Economic costs of hemophilia and the impact of prophylactic treatment on patient management. *Am J Manag Care 22*(5 Suppl), S126-S133.

While NIH funding increases have been generous over the past three years, the need remains to maintain global leadership in medical innovation, and to compensate for NIH funding not keeping pace with biomedical research inflation between 2003 and 2015.[8] This era resulted in the grant application success rate diminishing to below historic averages. From 1980 to 2003, the grant application success rate ranged between 25 and 35 percent. By 2016, the grant application success rate had fallen to 19.1 percent.[8] Increases in funding to the NIH in general, and to the gene and cell therapy fields in particular, need to continue to support the potential progress in the development of these transformative treatments.

In conclusion, because NIH funding can contribute to the development of new gene and cell therapies to treat diseases with great unmet medical need, ASGCT encourages the Senate Committee on Appropriations, Subcommittee on Labor, Health and Human Services, Education, and Related Agencies to provide robust appropriations in its FY2019 funding to the many institutes and centers of the NIH that engage in gene and cell therapy related research. The Society also advocates for separate, specific appropriations to fund the Regenerative Medicine Innovation Project. We appreciate your consideration of these comments.

Sincerely,

Michele P. Calos, PhD
President

Timothy D. Hunt, JD
Government Relations Committee Chairman