TROY A. LUSTER, Ph.D.

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SUMMARY:

- Proven leader of scientifically rigorous gene editing teams in small and mid-size biotechs
- Expertise includes
    - CRISPR-based engineered cell therapies for immune-oncology and auto-immunity
    - characterizing on- and off-target edits for knock-out/in using NGS- and ddPCR-based assays
    - discovering and validating novel targets using CRISPR-based screening methods
- Experienced manager of
    - small teams of direct reports with various levels of experience (RA to AD)
    - larger cross-functional teams with diverse scientific backgrounds
- Experience managing internal and external research collaborations
- Experience working with Technical Operations teams to transfer research practices to development

EXPERIENCE:

Clade Therapeutics (acquired by Century Tx), Boston, MA 2022 – 2024
Senior Director, Head of Cell Engineering

- Led the Cell Engineering team using modern gene editing tools to generate and screen modified induced pluripotent stem cell (iPSC) clones for downstream differentiation workflows
- Led the Genomics Platform team developing NGS-based assays to profile engineered iPSCs and differentiated cell types
- Worked closely with Technical Operations, Computational Biology, and Quality teams to transfer engineering workflows, screen for off-target edits, and prepare regulatory documents

Intellia Therapeutics, Cambridge, MA 2017 – 2022
Director, Target Discovery (2022)

- Led cross functional group of platform-oriented teams focused on ex vivo pipeline expansion

Associate Director, Target Discovery (2021-2022)

- Led efforts to develop cutting-edge *combinatorial* CRISPR screening platforms for discovery of *paired* immune enhancing edits (IEEs) in primary human T cells
- Led efforts to develop and screen novel CAR libraries to discover new CAR architectures
- Managed a small lentivirus/retrovirus production group that generated research scale virus for company-wide projects

Principal Scientist, Functional Genetic Screening (2017-2021)

- Led efforts to build and QC custom CRISPR sgRNA libraries
- Worked closely with biologists and bioinformaticians to design, optimize, execute, and analyze multiple in vitro and in vivo CRISPR screens to identify targets that enhance the function of engineered T cell therapies in solid tumor microenvironments

Dana-Farber Cancer Institute, Boston, MA 2013 – 2017
Senior Scientist, Belfer Center for Applied Cancer Science

- Managed pooled CRISPR screening efforts to identify factors that regulate important immune-oncology pathways (Lizotte et al, CIR, 2018)

- Scientific lead for collaborative project with outside company (Evotec) to develop novel histone demethylase inhibitors. Managed efforts to validate epigenetic targets, identify PD biomarkers, and evaluate responder ID strategies using RNAi, CRISPR/Cas9, and tool compounds.

Human Genome Sciences, Inc., Rockville, MD 2007 – 2012
Senior Scientist I, Oncology Research Department (2011-2012)
- Screened oncology-related targets for *in vitro* susceptibility to antibody-drug conjugates
- Generated proof-of-concept data to validate a novel ligand-drug conjugate (LDC) platform, using IL2-drug conjugates to kill malignant T cells *in vitro* & *in vivo*
- Performed studies to characterize the mechanism of synergistic cytotoxicity generated by combining the TRAIL-R1 agonistic antibody mapatumumab with the small molecule Smac-mimetic HGS1029

Scientist, Oncology Research Department (2007-2011)
- Evaluated a BLyS-gelonin fusion toxin as an IND candidate for malignant B cell diseases in numerous *in vitro* and *in vivo* assays (Luster et. al., PLOS One, 2012)
- Performed studies to characterize the mechanism of synergistic cytotoxicity generated by combining the TRAIL-R1 agonistic antibody mapatumumab with the proteasome inhibitor bortezomib (Luster et. al., MCT, 2009)
- Utilized siRNA library screens to identify factors required for cell death induced by mapatumumab and bortezomib

UT Southwestern Medical Center, Dallas, TX 2003 – 2007
Post-Doctoral Fellow, Department of Pharmacology
Laboratory of the late Philip E. Thorpe, Ph.D.
- Discovered that a novel tumor vasculature specific antibody (2aG4) required a serum co-factor known as β2-glycoprotein I (β2GPI) to bind its lipid target (Luster et. al., JBC, 2006)
- Generated a novel β2GPI-Fc fusion protein to target the membrane phospholipid phosphatidylserine exposed on the surface of tumor endothelial cells (USPTO #8,956,616)
- Awarded fellowship from the American Cancer Society in 2005 to study the anti-tumor effects of 2aG4 combined with radiation therapy

University of Nebraska Medical Center, Omaha, NE 1998 – 2003
Graduate Student, Eppley Cancer Institute
Mentor: Angie Rizzino, Ph.D.
- Dissertation: "Transcriptional Regulation of the Fibroblast Growth Factor-4 Gene: Characterization of the Distal Enhancer Element"

EDUCATION:

University of Nebraska Medical Center, Omaha, NE
Ph.D., Molecular Biology, 2003 (Eppley Cancer Institute - Cancer Research Training Program)

University of Nebraska-Lincoln, Lincoln, NE
B.S., Biological/Biosystems Engineering, 1997

HONORS AND AWARDS:
- American Cancer Society Post-Doctoral Fellowship
- Grand Prize: 3rd Annual UTSW Postdoctoral Symposium and Poster Session

- Earned rank of Eagle Scout from Boy Scouts of America (highest achievement in scouting)

PATENTS:

Thorpe PE, **Luster TA**, King SW. 2015. Constructs binding to phosphatidylserine and their use in disease treatment. US Patent 8,956,616, filed January 24, 2006, and issued February 17, 2015.

SELECTED PUBLICATIONS:

1. Li F, Ng WL, **Luster TA,** Hu H, Sviderskiy VO, Dowling CM, Hollinshead KER, Zouitine P, Zhang H, Huang Q, Ranieri M, Wang W, Fang Z, Chen T, Deng J, Zhao K, So HC, Khodadadi-Jamayran A, Xu M, Karatza A, Pyon V, Li S, Pan Y, Labbe K, Almonte C, Poirier JT, Miller G, Possemato R, Qi J and Wong KK. Epigenetic CRISPR screens identify Npm1 as a therapeutic vulnerability in non-small cell lung cancer. (2020) *Cancer Res.* 80(17), 3556-3567.
2. Li F, Huang Q, **Luster TA**, Hu H, Zhang H, Ng WL, Khodadadi-Jamayran A, Wang W, Chen T, Deng J, Ranieri M, Fang Z, Pyon V, Dowling CM, Bagdatlioglu E, Almonte C, Labbe K, Silver H, Rabin AR, Jani K, Tsirigos A, Papagiannakopoulos T, Hammerman PS, Velcheti V, Freeman GJ, Qi J, Miller G, Wong KK. In Vivo Epigenetic CRISPR Screen Identifies Asf1a as an Immunotherapeutic Target in Kras-Mutant Lung Adenocarcinoma. (2020) *Cancer Discov.* 10(2), 270-287.
3. Lizotte PH, Hong RL, **Luster TA**, Cavanaugh ME, Taus LJ, Wang S, Dhaneshwar A, Mayman N, Yang A, Kulkarni A, Badalucco L, Fitzpatrick E, Kao HF, Kuraguchi M, Bittinger M, Kirschmeier PT, Gray NS, Barbie DA, Jänne PA. A High-Throughput Immune-Oncology Screen Identifies EGFR Inhibitors as Potent Enhancers of Antigen-Specific Cytotoxic T-lymphocyte Tumor Cell Killing. (2018) *Cancer Immunol Res.* 6(12), 1511-1523.
4. **Luster TA**, Mukherjee I, Carrell JA, Cho YH, Gill J, Kelly L, Garcia A, Ward C, Oh L, Ullrich S, Migone TS, Humphreys R. Fusion toxin BLyS-gelonin inhibits growth of malignant human B cell lines in vitro and in vivo. (2012) *PLOS One*. 7(10), e47361.
5. He J, Yin Y, **Luster TA**, Watkins L, Thorpe PE. Antiphosphatidylserine antibody combined with irradiation damages tumor blood vessels and induces tumor immunity in a rat model of glioblastoma. (2009) *Clin Cancer Res.* 15, 6871-6880.
6. **Luster TA,** Carrell JA, McCormick K, Sun D, Humphreys R. Mapatumumab and lexatumumab induce apoptosis in TRAIL-R1 and TRAIL-R2 antibody-resistant NSCLC cell lines when treated in combination with bortezomib. (2009) *Mol Cancer Ther.* 8, 292-302.
7. He J, **Luster TA**, Thorpe PE. Radiation-enhanced vascular targeting of human lung tumors in mice with a monoclonal antibody that binds anionic phospholipids. (2007) *Clin Cancer Res*. 13, 5211-5218.
8. **Luster TA**, He J, Huang X, Maiti SN, Schroit AJ, de Groot PG, Thorpe PE. Plasma protein beta-2-glycoprotein-1 mediates interaction between the anti-tumor monoclonal antibody 3G4 and anionic phospholipids on endothelial cells. (2006) *J Biol Chem.* 281, 29863-29871.
9. **Luster TA** and Rizzino A. Regulation of the *FGF-4* gene by a complex distal enhancer that functions in part as an enhanceosome. (2003) *Gene*. 323, 163-172.
10. **Luster TA,** Nowling T, Lamb K, Johnson L, and Rizzino A. Effects of three Sp1 motifs on the transcriptional regulation of the FGF-4 gene. (2000) *Mol Reprod Dev.* 57, 4-15.

REFERENCES - *Available Upon Request*