



Job Title: Senior Scientist, R&D
Reports to: Sr. Director, Head of AD/QC
Employment Type: Full-time, Onsite
Location: Philadelphia, PA

About BlueWhale Bio

BlueWhale is a clinical-stage, revenue-generating biotechnology company committed to expediting the expansion and acceptance of cell-based therapies. Given the demand for cell therapy products that outstrip the available supply, BlueWhale Bio is addressing crucial deficiencies within the existing manufacturing framework. BlueWhale Bio's founding scientific team is led by Dr. Carl June and Dr. James Riley (University of Pennsylvania). Our team of scientists draws from a wealth of expertise, and it is developing an innovative platform and groundbreaking product portfolio to address critical shortcomings in the current process of cell therapies. Our technology holds the promise of bringing the full benefits of cell therapy to a broader spectrum of patients, doing so more rapidly and at a reduced cost.

About the Role

The Senior Scientist, R&D will lead mechanistic studies enabled by engineered cell line systems, with a focus on defining mechanism of action (MoA) and enabling rapid hypothesis testing for T cell activation strategies.

In this role, you will design and build recombinant cell-based model systems (e.g., K562) using viral and transposon-based genetic engineering approaches to systematically interrogate signaling pathways and molecular drivers of T cell, C cell and iPSC activation and expansion. These engineered systems will serve as scalable, modular platforms to test and refine hypotheses around receptor engagement, costimulation, and cytokine signaling.

The candidate will integrate cell line development, molecular engineering, and functional immunology to uncover key determinants of product performance and help to develop new technologies. You will collaborate closely with Analytical Development (AD), Process Development, and leadership to translate mechanistic insights into design principles, product improvements, and critical quality attributes (CQAs).

Key Responsibilities

- Lead design and execution of mechanistic studies using engineered cell line systems to define drivers of T cell activation, expansion, and function
- Design, generate, and characterize recombinant K562 and related cell lines to model antigen presentation, costimulation, and signaling environments
- Apply viral (lentiviral/retroviral) and transposon-based (e.g., Sleeping Beauty, PiggyBac) approaches for stable genetic engineering
- Develop modular cell-based assay systems to test T cell activation strategies (e.g., receptor-ligand interactions, costimulatory combinations, cytokine cues)
- Design and execute perturbation studies (genetic, pharmacologic, cytokine modulation) to dissect signaling pathways and MoA
- Build and refine mechanistic models linking engineered system outputs to primary T cell functional responses
- Define key parameters (e.g., ligand density, expression levels, spatial organization) impacting T cell activation and product performance
- Collaborate cross-functionally to translate findings into CQAs and product design strategies
- Mentor junior scientists in cell line engineering, assay development, and mechanistic study design
- Drive innovation in platform development for rapid hypothesis testing and screening
- Author technical reports and present findings to internal stakeholders and leadership
- Ensure high scientific rigor, reproducibility, and scalability of engineered systems

Education and Experience

- BSc (5–8 years), MSc (3–6 years), or PhD (0–2 years) in Chemical Engineering, Molecular Biology, Immunology, Microbiology, or related field preferred
- Strong multidisciplinary background in immunology and cellular biology
- Extensive experience with human primary immune cells and functional assays
- Deep expertise in flow cytometry and immune profiling
- Experience with genetic perturbation approaches (CRISPR, shRNA, overexpression systems)
- Hands-on experience with stable cell line engineering (e.g., K562 or similar cell lines)
- Experience with viral vector systems (lentivirus/retrovirus) and/or transposon-based engineering methods



- Demonstrated ability to design complex experiments and interpret multi-dimensional datasets
- Ability to work effectively in a fast-paced, collaborative environment
- Strong analytical and problem-solving skills
- Mechanistic scientific thinking
- Excellent communication and collaboration abilities
- Experience working with cross-functional teams and clients

BlueWhale Bio is an equal opportunity employer. We offer an inspiring and innovative environment for talented professionals to contribute to groundbreaking research and advancements in the biotech industry. Join us as we shape the future of cell therapy and improve human lives through scientific excellence.

Contact us: careers@bluewhale.bio