

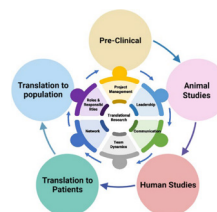
From academia to industry: the emerging role of a clinical and translational scientist

Matteo Tardelli is a Clinical and Translational Scientist at Owlstone Medical. The role of a Clinical and Translational Scientist is increasingly pivotal in the biotech industry, acting as a bridge between laboratory research and clinical application. Notably, this is a role that did not exist or was not widely recognized 10 years ago when he began his PhD. This article delves into the journey from academia to industry, exploring the necessary skills, challenges, and opportunities inherent in this transition. It also provides a comparative analysis of the roles in both settings and offers advice for aspiring scientists.

A Clinical and Translational Scientist is a professional who transforms scientific discoveries from the lab into practical medical treatments and diagnostics. They play a crucial role in translating preclinical research (such as experiments performed in animal models or cell culture) into clinical trials, ensuring that new therapies and technologies reach patients effectively and safely. This role is essential in bridging the gap between research and clinical applications, driving innovation, and improving healthcare outcomes.

Career transition

Many Clinical and Translational Scientist professionals come from an academic background, often holding advanced degrees in fields such as biochemistry, molecular biology, or pharmacology. In academia, these scientists typically engage in preclinical research, focusing on understanding disease



The multiple processes and steps around translational research (10.1186/s41231-023-00153-9).

mechanisms and identifying potential therapeutic targets. For instance, research might involve studying the molecular pathways involved in obesity, diabetes, and liver diseases. The transition from this set up in academia to industry can be motivated by various factors, including a desire to

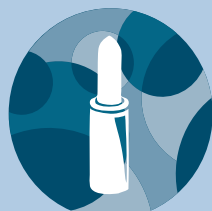
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see tangible clinical applications of one's research and the limitations of bench work and animal experimentation. In the biotech industry, the focus shifts from basic research to applied science, where the primary goal is to develop and validate new treatments and diagnostics for clinical use. Transferable skills like data analysis, experimental design, and critical thinking are essential in transitioning from academia to the biotech industry. The ability to interpret complex experimental results and design robust experiments in academia directly supports data-driven decision-making and clinical trial design in industry settings. Critical thinking and problem-solving, honed through academic research, become invaluable for overcoming challenges in drug development. Additionally, collaboration and communication skills developed through working with multidisciplinary teams in academia are crucial for effective teamwork and coordination across various functions in the industry, including Clinical and Translational Sciences.

One of the key tasks for some Clinical and Translational Scientists is developing biomarker strategies for early-stage clinical trials. Biomarkers are crucial for assessing the efficacy and safety of new treatments. Clinical and Translational professionals design and implement strategies to identify and validate these biomarkers, which can predict clinical outcomes and guide therapeutic decisions. When transitioning to the biotech industry, these same skills are adapted to focus on applied science. In industry, the goal shifts from purely understanding biological processes to developing and validating new treatments and diagnostics that can be used in clinical settings. For instance, a scientist with a background in molecular biology might use their understanding of disease pathways to design targeted therapies, which are drugs tailored to interrupt specific molecular interactions within a disease. Similarly, a pharmacologist's knowledge of drug interactions and side

effects is essential during the drug development process, particularly in optimizing the safety and efficacy of new treatments during clinical trials.

Collaboration is another significant aspect of the role. Clinical and Translational professionals work closely with clinical trial teams and biostatisticians to analyze data from clinical studies. They must be adept at interpreting complex datasets, validating findings, and correlating them with clinical metadata to draw meaningful conclusions about a treatment's effectiveness and safety. In fact, validating preclinical findings in a clinical context is a critical responsibility. This involves rigorous testing and correlation with clinical data to ensure that the laboratory discoveries hold true in patient populations. Successful validation can lead to the development of new therapies and diagnostic tools that improve patient care.

Challenges

One of the primary challenges for Clinical and Translational professionals is overcoming communication barriers with data scientists and biostatisticians. Effective communication is essential for successful collaboration, but differences in training and expertise can sometimes lead to misunderstandings. Developing a common language and mutual respect for each discipline's contributions is crucial. In addition, the rapidly evolving nature of biotechnology requires Clinical and Translational Scientists to engage in continuous learning. A strong biology background is essential, but staying updated with the latest advancements in both science and technology is equally important. This continuous learning ensures that one can effectively translate new discoveries into clinical applications.

In academia, the focus is often on understanding fundamental mechanisms, while in industry, the emphasis is on developing marketable products and treatments.



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Navigating these differing priorities requires flexibility and a strategic approach. This transition can also bring about a sense of identity crisis for some professionals. In academia, one's identity is often closely tied to being a researcher focused on discovery and theoretical knowledge. Moving to industry shifts the focus to applied science, product development, and tangible outcomes, which can require a significant adjustment in mindset. The shift from pursuing knowledge for its own sake to driving commercial and clinical applications can be disorienting, as the measures of success and professional identity differ substantially between these environments.

Advice for aspiring scientists

For scientists considering a transition from academia to the biotech industry, the following advice can be invaluable:

1. *Build a strong foundation:* A robust background in biology and related sciences is crucial. Focus on gaining a deep understanding of disease mechanisms and therapeutic targets. To strengthen this foundation, consider taking advanced courses or certifications in areas directly relevant to biotech, such as molecular biology or pharmacology.
2. *Develop interdisciplinary skills:* Enhance your ability to collaborate with professionals from various disciplines, including data science, biostatistics, and clinical research. You can do this by participating in interdisciplinary research projects or joining cross-functional teams to broaden your exposure and experience working with diverse experts.
3. *Embrace continuous learning:* Stay abreast of the latest developments in biotechnology and clinical research. Attend conferences, participate in workshops, and engage with professional networks. Additionally, subscribing to industry journals and online courses can help you stay updated on emerging trends and technologies.
4. *Gain industry experience:* Seek internships or collaborations with biotech companies to gain practical experience and understand industry dynamics. You could also volunteer for industry-related projects or consult for biotech startups to build relevant experience while still in academia.
5. *Communicate effectively:* Work on your communication skills to bridge gaps between different fields and facilitate successful collaborations. Practically, this can be done by practicing presenting your research to non-expert audiences or writing articles and blogs aimed at a broader audience to refine your ability to convey complex ideas simply.

Conclusion

The role of a Clinical and Translational Scientist is critical in the biotech industry, enabling the translation of scientific discoveries into clinical applications that benefit patients. Transitioning from academia to industry involves developing new skills, overcoming challenges, and continuously learning. By understanding these dynamics and preparing accordingly, aspiring scientists can successfully navigate this transition and contribute to advancing healthcare through innovative biotechnological solutions. ■