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MEETING REPORT

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Cell adhesion and migration in disease: translational and therapeutic opportunities

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ABSTRACT

In September 2023 members of the cell adhesion and cell migration research community came together to share their latest research and consider how our work might be translated for clinical practice. Alongside invited speakers, selected speakers and poster presentations, the meeting also included a round table discussion of how we might overcome the challenges associated with research translation. This meeting report seeks to highlight the key outcomes of that discussion and spark interest in the cell adhesions and cell migration research community to cross the perceived valley of death and translate our work into therapeutic benefit.

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Report

Basic research is the source from which targets, tools, and ideas flow into drug discovery. However, the process by which mechanistic understanding is converted into pharmaceutical products can seem bewildering to academic researchers. Academics are increasingly encouraged by their funders and hosting institutions to translate their results into products which will benefit society (and maybe earn some money). A new generation of researchers even sees translation as an organic part of the research process rather than a secondary step. Yet the path from bench to bedside can be difficult to navigate. Most ideas which seem promising in the lab eventually wind up parked or abandoned on the translational roadside.

Exploring the translational and therapeutic opportunities arising from adhesion and migration research was the goal of a 2-day conference co-organized by the Royal Microscopical Society at the University of Warwick in September 2023. The dynamics and behavior of migrating cells have been studied since the 1950s, but therapeutic interest in the underlying science has lagged in comparison to hot topics like DNA repair or immuno-therapy. This has recently begun to change, for example, with recognition by the FDA of metastasis-free survival as a distinct primary endpoint of a clinical trial [1] and the emerging field of migrastatic research [2]. Work presented at the meeting highlighted the translational potential of topics including kinase inhibition of migration pathways, suppression of invasive migration, targeting of Rho family GTPase activity, and modulating the migration of immune cells in human disease.

To directly address the challenges of research translation, the meeting included a lively roundtable discussion, chaired by Yolanda Calle. The roundtable panel, Davide Danovi (visiting at KCL), Stuart Farrow (Cancer Research Horizons), Angelica Figueroa (INIBIC-Biomedical Research Institute A Coruna), Stephanie Hopley (Apollo Therapeutics), Pamela Lochhead (AstraZeneca), and Paul Mercer (Francis Crick Institute), was designed to represent the perspectives of different stakeholders engaged in translational research including industry experience in project selection, bridging the gap between academia and industry, and previous success in developing industry partnerships.

The starting point for the discussion was navigating the translational 'valley of death'; i.e. the daunting gulf between opportunities emerging from academic labs and products under commercial development. How can academic researchers navigate this gulf?

Angelica Figueroa started by emphasizing that 'Proof of Concept' is only the start of a journey. She emphasized that academics generally underestimate the length of the

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journey and the amount of help they will need navigating the translational landscape. She highlighted the need to bring in business expertise to smooth the path, support fund raising and underpin patent applications. Davide Danovi spoke about cultural differences between academia and industry. In his experience academics are scared to move away from their circle of friends and don't always view real world applications as a positive thing for their science. He suggested that the culture in academia was not always conducive to commercially successful innovation where the most important aspect might be to identify your market need rather than be driven by the basic science. Paul Mercer agreed that a cultural and intellectual shift was needed from understanding a mechanism to developing a product. Pamela Lochhead suggested that the main challenges of time and money remain the same and that a critical starting point is to build the right team.

Paul Mercer provided the sobering reminder that most ideas will fail, and that industry therefore favors projects with clear go/no go points which have the ability to fail quickly. This is a stark reminder of the asymmetry of the drug discovery process: academics want their ideas to succeed, whereas industry is happy with ideas that fail quickly. So how can academics maximize their chances of success?

Stephanie Hopley highlighted things you don't need: any experience with drug discovery, IP, or assessment of the commercial landscape. These are things industry will provide and manage. In contrast, Angelica Figueroa and Davide Danovi discussed the possibility of academics taking into their hands the translational journey as a whole becoming entrepreneurs themselves, an adventure that both of them have embarked on. Stuart Farrow concurred that what you really need is a good idea, as opposed to a specific target. It was acknowledged that there is a tension between the needs of academia, where publications are required, and the needs of drug discovery, where they are not. Stuart Farrow reiterated that the role of industry is joining the dots, whereas academics are encouraged to plant the seeds. Angelica Figueroa suggested that academics should get a good team together, with the right skills and that might look like a different team to one geared toward basic science research. The panel agreed that the work needed to push forward a translational project which may fail is not attractive to post doctoral scientists who need publications to progress their career. Davide Danovi expressed his frustration that this kind of work is not always valued in academia which tends to focus on publication and individual efforts. Paul Mercer said you need to develop relationships in order to overcome the culture clash. For this reason, it can be helpful to do things which build trust with other stakeholders, even if they seem to only marginally advance the project. Angelica said it was often better to delay spinning out, that adding value and resilience before spinning out will put you in a stronger position with venture capitalists. Having heard some important perspectives from the panel members, the floor was opened to questions. This led to discussion of what industry accepts as in vivo studies, where it was agreed that mice are still favored despite much progress with other model systems. Others commented that the academic community (and staff in university Tech transfer offices) need more training/interaction with companies to better understand the language and landscape of commercial translation.

One of the key themes to emerge from the discussion is that translation of scientific results into commercial products is very much like translation of one language into another. Academia and industry speak different languages, so an important first step for academics wanting to thrive in the land of industry is to learn the language of industry in order to understand and communicate with relevant stakeholders. Indeed, the panel acknowledged that the challenges for translating research were similar across all areas of basic research and not limited to cell adhesion and migration. The organizers would like to thank all the panel members for giving up their time to help us navigate the valley of death. We are excited to see if the cell adhesion and migration community can give rise to the challenge.

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Author contributions

KA, YC-P, AI, FV, CW, MP and IMA compilation and organization, review, editing and formatting.
KA, YC-P, AI, FV, CW, MP and IMA agree to be accountable for all aspects of the work.

Data availability statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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