Breaking down silos in drug development

why interdisciplinary integration is fundamental for pharma's future

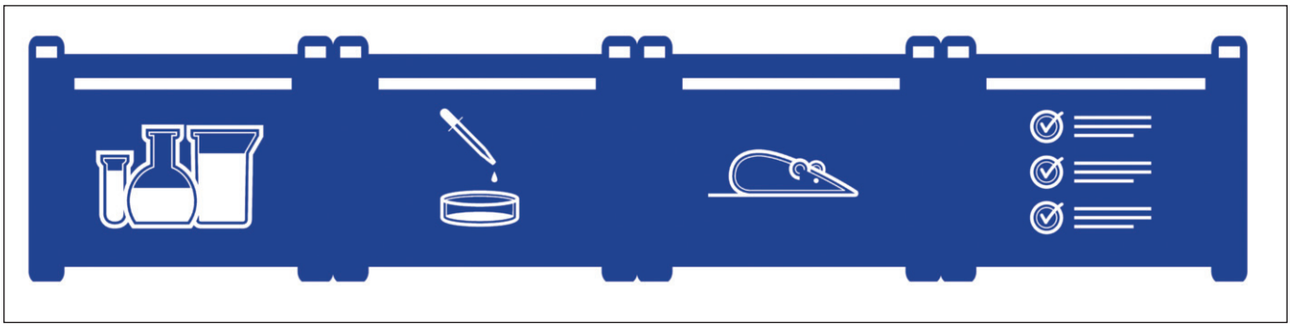
A silo mentality is an issue for any organisation, but it is particularly problematic for the pharmaceutical industry. Drug development is a multidisciplinary endeavour that relies on the cumulative efforts of highly skilled teams in order to be successful. Yet these teams cannot work in isolation. Few development challenges reside within their own 'bubble'; without careful planning and good communication, the solutions adopted to overcome one obstacle can have a significant knock-on effect elsewhere in the development pipeline. As a result, fragmented thinking can lead to poor decision-making, costly hold-ups, and even contribute to the failure of entire programmes. In this article, we consider the symptoms and consequences of a silo culture in drug development, and look at how interdisciplinary integration should be at the heart of every pharma business model.

By Dr Paul Overton

With the pharmaceutical industry under continued pressure from tightening international healthcare budgets and increased regulatory complexity due to a wealth of new technologies, drug developers are looking for faster and more resource-efficient ways to bring safe and effective medicines to market. Increasingly, pharmaceutical companies are not only recognising the benefits of taking a joined-up approach within their own organisation, but with the contract research organisations (CROs) they work with too. So, how can interdisciplinary integration in drug development expedite drug development programmes and turn molecules into medicines as cost-effectively as possible?

Challenges for the industry

Following modest but steady growth in the number of drug approvals over the past decade, the number of new medicines granted market approval fell significantly in 2016, with just 22 new molecular entities approved by the FDA – fewer than half of 2015's figure[1]. Many have been quick to explain away this dip, pointing to advanced or delayed approvals, technology glitches and updates to current Good Manufacturing Practices standards



An integrated drug development pipeline

(cGMP). 2016 also served as a reminder to sponsors that all manufacturing facilities must be compliant with cGMP regulations to ensure approval of their application[1].

However, it could be argued that the industry's 'class of 2016' highlights a drug development pipeline that's not quite as robust as we thought. Indeed, even mainstream news outlets are reporting on the status of the industry, particularly regarding the lack of new antibiotics and dementia drugs coming through. From a public health perspective, this is a significant concern.

Taking a lead compound successfully through pre-clinical studies, formulation development, regulatory submission and into the clinic is not an easy task; the road to market approval is littered with discontinued drug projects. But now, more than ever before, it seems there is a real need to improve efficiencies in drug development to reduce timelines and costs to ensure the pipeline is fit for the future. Companies need to consider new approaches that will lead to timeline reduction so that drugs are more profitable to fund the next wave of treatments.

Combatting fragmented thinking in pharma

Set against a backdrop of squeezed global healthcare budgets, increased regulatory complexity and an ongoing war on attrition, many pharmaceutical companies are reviewing how they approach drug discovery in order to reduce drug development timelines and ensure every dollar invested delivers maximum 'bang for buck'.

Like many other industries dependent on the collective efforts of multiple teams made up of highly skilled specialists, the pharmaceutical industry has historically been vulnerable to a 'silo' mentality, characterised by ineffective inter-departmental communication and poor organisational efficiency.

Of course, these silos are not there by design. Silo mentality typically develops as a result of poor top-down management or flawed organisational structure. Perhaps teams have competing interests, or significant operational overlap. Ultimately, the outcome is the same: critical information and procedural best practices do not flow freely between groups. This can lead to decisions being made based on incomplete or out-of-date information, often resulting in increased workloads, missed deadlines and outcomes that do not meet the desired goals or specifications.

For the pharmaceutical industry, a silo mentality is highly problematic. For starters, fragmented thinking is a major source of workflow inefficiency and often results in the duplication of efforts. Not only does this result in wasted time and investment, it can also throw up critical development challenges when issues need not have arisen. For example, performing poorly thought out pre-clinical toxicology studies using conditions chosen simply due to departmental preference, rather than because of their relevance for the drug project as a whole, can unduly raise questions about product safety simply due to poor experimental design.

While the duplication of data collection can be a waste of time, effort and resources, the absence of critical data can be terminal for a drug development project. Misunderstandings and oversights due to poor communication can lead to critical data simply being left off the list. When it comes to making decisions on project direction, without all the necessary data at hand, poor decisions can be made.

Bringing a medicine to market is a multidisciplinary endeavour that relies on the cumulative efforts of individual teams in order to be successful. Few development challenges occur in isolation; the solutions adopted to fix one problem can have a significant impact on another. Efforts to improve drug molecule potency by tweaking the structure of an API, for example, can have significant implications for the formulation team. Without recognising the consequences of development decisions, fragmented

thinking can result in costly hold-ups, and even worse, loss of investment due to project failure.

The pharmaceutical industry is showing signs it is beginning to recognise the importance of interdisciplinary integration and is adopting organisational frameworks that allow specialist teams to collaborate and communicate much more closely.

However, even within those industries that champion cross-functional working, silos still happen. A recent study published in the Harvard Business Review found that three-quarters of cross-functional teams in leading corporations fail on at least three of five key project criteria: meeting a planned budget, staying on schedule, delivering according to specifications, meeting customer expectations and aligning with the company's goals[2].

The message is clear: interdisciplinary integrated working takes effort. To be truly effective it requires systematic implementation, clear guidance and a collective investment from the whole organisation in order to succeed.

Pharmaceutical outsourcing: are we building more silos?

The drug discovery landscape is rapidly evolving. External service providers such as CROs are playing an increasingly important role in the drug development process. Indeed, a 2016 Nice Insight survey of pharma and biotech industry representatives revealed spending on outsourcing is increasing significantly year-on-year[3]. It is thought that outsourcing will become a $43.7 billion industry by 2026, up from a modest $19.2 billion in 2016[4].

However, as external service providers increasingly become an intrinsic part of the drug development process for many organisations, there is growing concern that the industry is compounding an existing silo culture by adding more silos into the value chain.

Some developers choose to utilise the expertise of several independent specialist contractors. And for some projects this could be a more affordable solution. However, the use of multiple contractors might not be the most efficient, or cost-effective, approach. With multiple contractors, the big risk for developers, particularly small biotech companies and start-ups, is that isolated teams across companies can lose sight of the bigger picture. This often means decisions are made based on isolated and limited information, which can lead to costly delays and development hold-ups.

Moreover, with multiple contractors spread over several different sites, simply managing the logistics of the process can be time-consuming in itself. And with tight turnaround times and narrow project windows, even the smallest of delays caused by a single piece of the project overrunning can quickly snowball as projects are rescheduled, setting back entire programmes and resulting in lost time and investment.

However, there is an alternative. Increasingly, biotech and pharmaceutical companies looking to bring a quality drug to market quickly and cost-effectively are partnering with full service providers which can deliver a tightly integrated and comprehensive development programme under one roof.

By bringing all of the essential elements of a successful development programme together – from API manufacture and formulation development, through to safety and abuse liability assessment and the preparation of regulatory submission documents – the time between candidate nomination and regulatory submission can be routinely achieved in timeframes of between 37 and 52 weeks.

Of course, this can only be achieved when carefully managed within an organisational framework that puts interdisciplinary integration front and foremost. INDiGO programmes, for example, achieve this by eliminating the walls between project teams and ensuring specialist expertise resides within a multidisciplinary framework. Here, the highly-skilled experts responsible for heading up individual development stages are at the table when decisions are made that affect development programmes. As a result, critical decisions relating to the direction of development can be agreed between teams, based on what is right for the goals of the project, the client and the API, rather than departmental practice. This kind of collaborative working and forward thinking can eliminate the need for repeat experiments – shortening times to market and reducing development costs.

Reducing risk exposure in drug development

Interdisciplinary integration is not just about making organisations more efficient. After all, reducing the cost of developing a poorly-designed product is a cost-effective way of developing nothing at all. Collaborative working is also about managing exposure to risk and maximising the likelihood of success.

Drug development is an inherently risky business. Indeed, it is thought that just one in 10 drug molecules that enter Phase I clinical trials ultimately receives market approval[5]. Without appropriate measures to gate projects and guard against failure, even the most experienced developers can find that potential drug candidates fall by the wayside, with associated loss of time, effort and investment.

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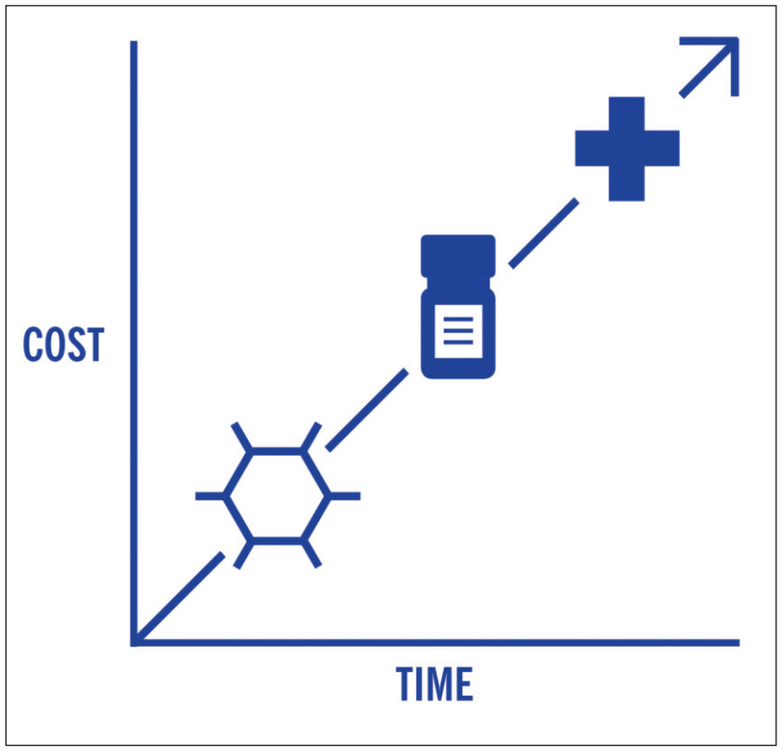

From lead candidate to regulatory submission, balancing time, cost and quality

One of the best ways to minimise exposure to risk is by performing a comprehensive assessment of the API at the earliest stages of development. Such an approach reduces the potential for unexpected development challenges, as the characteristics of the API are well defined and potential issues can be planned for in advance.

Here, adopting an integrated approach reduces the potential for API characteristics to be overlooked. With all teams involved in the programme from the outset, meeting regularly to discuss progress and development challenges, the chances of fundamental oversight occurring are significantly reduced.

Though even with the best laid plans, unexpected development challenges can and do happen. But with experienced experts from all key stages of the pipeline present at the table, programmes are more nimble and teams are empowered to more rapidly find solutions to challenges. With programmes built around clear leadership from an experienced programme leader, issues can be anticipated and planned for in a timely fashion.

Interdisciplinary integration: the right approach for tomorrow's challenges

Many of the most pressing challenges in drug discovery today are those that require joined-up thinking. Take the growing number of poorly soluble APIs in the drug discovery pipeline, for example. It is thought that around 70% of drug molecules currently under development are poorly water-soluble[6], posing potential development issues in terms of bioavailability.

For these BCS-II type compounds, where absorption is limited by the rate of dissolution rather than membrane permeability, the challenge is to develop and deploy enabling technologies to improve bioavailability through solubility enhancement. Successful implementation of appropriate formulation strategies is reliant upon close co-operation between the ADME experts, toxicology specialists, formulation chemists and those responsible for designing the animal model.

With the industry under continued pressure to reduce timelines, make cost-effective use of budgets and minimise exposure to risk, drug developers cannot afford to build silos. After all, drug discovery has always been a team effort.

By working with external partners which recognise the benefits of interdisciplinary integration and put a strong focus on intra-organisational collaboration, effective communication and robust planning and leadership, developers can expedite programme timelines and bring medicines to market more rapidly and cost-effectively. DDW

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