OVERCOMING CHALLENGES IN MULTI-DISCIPLINARY RESEARCH & DEVELOPMENT
A critical aspect of life science research and modern drug research and development (R&D) is the management of the vast volume of information produced by research facilities worldwide. Due to the variety of focus areas of the labs producing the data, it is no longer sufficient to focus on a single field of science; inter-disciplinary research is the only way to cover all bases. We talked to the head of a group of information managers at a major European pharmaceutical company to get an inside perspective on what inter-disciplinary research means in practice and to see how current developments in research informatics might overcome some of the challenges that exist.

Information managers play a crucial role in the information flow. “We support other departments with information. We ensure that they have access the data they need — not just by supplying the information but also by giving access to the right tools.”

These tools are cutting-edge research informatics that search curated databases for answers to all the questions that come up in the course of research. There are considerable demands for both new and old data and no single solution can meet those needs. “We use multiple research informatics solutions. Each one has its strengths. When we’re researching a particular issue, we might use one product to start the search — set the main parameters or get an overview of the environment or even identify some search terms that can form the best basis for our search — and then switch to a different one to narrow the search down or perform an exploded search.”

“Obviously, since we have to use multiple solutions, it’s good to have a preferred partner — a single supplier of several solutions. We have found that very advantageous when it comes to getting support for work that needs multiple solutions or even crosses disciplines. For example, we’ve collaborated closely with the Elsevier Life Sciences team to see which of their solutions are best suited to particular searches and how best to go from one research solution to another. Having the support of a preferred partner definitely makes research easier.”

As mentioned, it is not a given that one particular search is restricted to a single scientific discipline. Drug development in particular requires information on a broad range of topics, including chemical structures and reactions, biological pathways, drug–target interactions, and regulatory submissions. “As mentioned, the various research informatics solutions have individual merits. There is no one product that does everything that we need or covers every discipline.”
Naturally, needing to work with more than one product to perform a search can slow down the research process. It takes time to re-create a search or create a new search in a second or third tool, especially considering the differences in interfaces and command-line search syntax between products from different suppliers. The data itself can differ. For example, small molecules can have CAS, NCBI, InChIKey, and/or IUPAC identifiers and not every database uses the same sets of identifiers.

However, there is potential to overcome these issues: a portfolio of solutions covering various disciplines with the ability to work together. “I think having a group of research informatics solutions that could interact would be a huge advantage, especially if the data was somehow normalized.”

Relevant interaction between solutions is a major goal of the Elsevier Life Science Solutions group. A portfolio of solutions that can communicate with each other so that a single search query can access multiple databases and return consolidated results is not far from reality. For example, pharmacovigilance is facilitated by the smooth communication between Embase and PharmaPendium. A search for a drug in Embase retrieves adverse event information from the biomedical literature and conference proceedings but also pulls information from the unique collection of FDA and EMA documentation in the PharmaPendium database.

One search covers delivers significant data on pharmacovigilance and other drug safety information to help make better strategic decisions.

Early-stage drug discovery is also simplified by the seamless interactions established between Reaxys and Reaxys Medicinal Chemistry and between Reaxys and PharmaPendium. A single search can retrieve information about a drug candidate’s chemical structure, synthesis and reactions from Reaxys, display normalized bioactivity data from Reaxys Medicinal Chemistry and link to FDA and EMA information in PharmaPendium.

These are just two examples of the potential of the portfolio approach to research informatics. This data exchange is facilitated by an ongoing project to normalize data across the products of the Elsevier Life Science Solutions portfolio with the aim is to provide the most powerful support for drug R&D and life science research.

The future of inter-disciplinary investigation involves seamless interaction between powerful research informatics versus toggling between separate, unlinked products that re-create searches and ultimately retrieve information twice. This will give researchers greater access to relevant information, including answers they may otherwise not have found. It’s a bright future with a lot of promise, and we’re well on the way to achieving it.