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# PharmEnable: unlocking chemical space and creating the medicines of the future

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Abstract: PharmEnable is a fast-growing startup, founded in the Cambridge ecosystem by Dr Hannah Sore in 2016. The company focuses on designing the next generation of small molecules and targeting otherwise untreatable diseases. PharmEnable is using an interdisciplinary approach by bringing together cutting-edge science and advanced AI/computational methods.

Keywords: Small molecules, Drug discovery, PharmEnable

## 1. The success story

PharmEnable is a Cambridge (UK) based drug discovery company that is using a combination of medicinal chemistry and Artificial Intelligence (AI) computational approaches to design the next generation of small molecule drugs. The mission of PharmEnable is to develop novel and specific drugs for otherwise untreatable conditions. The company was founded around the principles of diversity-oriented synthesis (DoS), based on the research coming out of Prof David Spring's Lab at Cambridge University. PharmEnable uses AI methods to map out the possible chemical space of drug-like molecules and their biological effects, and designs novel and 3-dimensional molecules in order to successfully drug particularly challenging biological targets. The unique approach of the company focuses on efficiently exploring and mapping the possible chemical universe by designing novel small molecules that are 3D and inspired by nature.

PharmEnable's proprietary platform consists of two parts:

- ChemUniverse: A diverse, synthetically accessible virtual database of unique 3D complex molecules with effective chemical space coverage.
- ChemSeek: A suite of state-of-the-art AI methods and gold standard computational tools for finding and developing drugs from structure and ligand data.

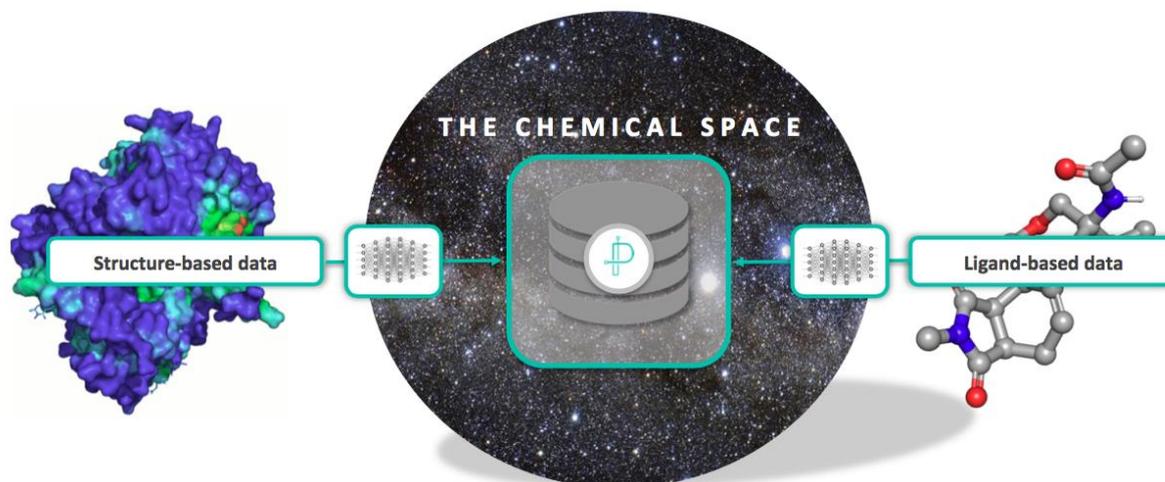
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PharmEnable is using AI-enabled design that consists of make, test and analyse (DMTA) cycles that facilitate rapid and unbiased decision making when developing novel drug candidates.



**Figure 1.** PharmEnable applies AI/ML techniques in combination with diversity generating technology to ensure a broad and efficient coverage of bioactive chemical space.

## 2. Where did it start

PharmEnable was founded by CEO Dr Hannah Sore. Hannah is a medicinal chemist by background, she has worked across academia and pharma, and had a successful business consulting career. In 2012, after being seriously ill from sepsis, Hannah decided to leave consulting behind, and instead dedicate herself to creating the next generation of new small molecule drugs. She put together a team of Cambridge scientists and entrepreneurs, in order to create innovative solutions to some of the biggest healthcare challenges.

The early story of PharmEnable emerges out of the research and the collaborative ecosystem that is typical of Cambridge University. The company was co-founded by Hannah, Dr Natalia Mateu (CSO) and Dr Jelena Aleksic (CBO). Hannah met Natalia, an organic and medicinal chemist with a particular focus on diversity generating methodologies, in the Spring lab. Natalia has shaped the scientific methods that form the foundation of PharmEnable's unique offering. Hannah approached Jelena after she saw her giving a lecture on entrepreneurship. Jelena is a geneticist and serial entrepreneur, passionate about building businesses with a scalable positive impact in the world. The early efforts were also greatly boosted by the help and advice of Dr Andreas Bender, an expert in AI and chemoinformatics.

Cambridge brings together scientific expertise and commercial experience, to produce innovations with global impact. PharmEnable is created by a highly driven team brought together by a shared mission to create revolutionary new medicines.



Figure 2. World Class Team of PharmEnable.

### 3. Why is it needed?

In recent years drug discovery has had a special focus on big molecules which have provided novel treatments and cures for a wide range of diseases. Although significant progress is being made, more than 90% of the drugs currently available worldwide are still small molecules. While small molecule drugs may sound old-fashioned to some, their impact is significant and drug developers continue to work with small molecules as they present many benefits that include:

- Relatively simple to manufacture and scale-up, and tight quality control.
- Cheaper to produce than biologics.
- Higher drug design versatility.
- Flexibility of administration routes. Small molecules may be formulated as pills and capsules, intravenous or subcutaneous injectables and inhalables, giving great flexibility in the clinic [1].

Small molecule drugs are often synthetic or naturally derived chemical molecules generated by organic chemistry techniques [1]. PharmEnable focuses on creating chemical diversity and designing molecules that are 3-dimensional, highly complex, and can be synthesised. The ChemUniverse and ChemSeek platforms enable unlocking novel parts of chemical space, identifying hits with improved specificity compared with traditional screening methods.



Figure 3. Platform technology developed by PharmEnable.

#### 4. The journey so far

PharmEnable has a range of in-house projects and ongoing partnerships across a range of disease areas where drug specificity is a significant challenge, such as cancer and neurodegenerative disease. A particular interest of the company is in targeting specific protein-protein interactions of major cancer targets.

In 2019 PharmEnable was selected to be a part of the KQ Labs, a prestigious accelerator programme for data-driven healthcare startups funded by Innovate UK and run by the Francis Crick Institute. This 16-week program helped PharmEnable to accelerate business growth.

In June 2020, during the worldwide COVID-19 pandemic, PharmEnable closed a £1.8 million seed financing to support its transition into a drug development company. The round, which was significantly over-subscribed, was led by Cambridge Enterprise, the commercialisation arm of the University of Cambridge, as well as the University of Cambridge Enterprise Fund VI, managed by Parkwalk Advisors. It also attracted support from a wealth of angel investors and notable life science funds, including Jonathan Milner, serial entrepreneur and founder of Abcam; Andy Richards, Cambridge-based entrepreneur and investor; David Ford, Oxford-based life sciences angel investor; the family office of Paul Forster, co-founder of Indeed.com; Ian Tomlinson, chairman of several bio-incubators, entrepreneur and co-founder of Domantis; KQ Labs at the Francis Crick Institute; Martlet Capital, a Cambridge-based investor with a growing portfolio of innovative life science companies; the fast-growing o2h ventures Human Health EIS fund; and Wren Capital, the established London-based angel investor in science, engineering and software businesses.

#### 5. Looking to the future

PharmEnable will use the funding to evolve its business model and invest in a pipeline of drug discovery programmes across a number of disease areas including cancer and neurodegenerative disease. Additionally, PharmEnable will continue to engage in strategic partnerships with pharma, biotechs and academia to provide innovative, cost-effective and

efficient ways to identify new drug candidates. The innovative idea and approach have attracted an experienced Board and management team including Dr Jane Dancer, previously of F-star, who joined as the Board Chair.

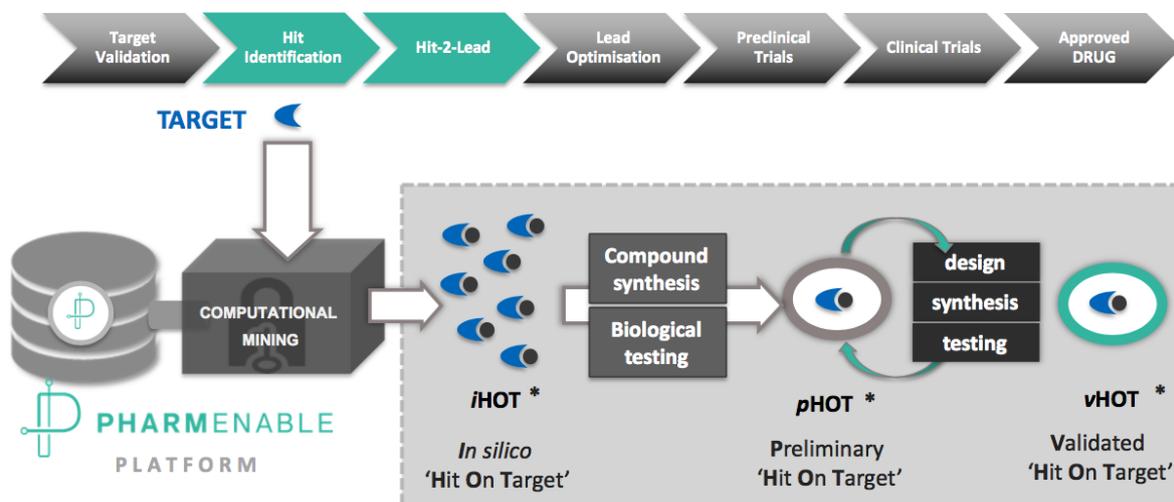


Figure 4. PharmEnable allows rapid and efficient drug discovery.

## References

[1] Pharmaceutical Research and Manufacturers of America (PhRMA), Apr. 2014.

## The company



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**Agnieszka Wabik** currently works as a Business Development Associate at Wellcome Genome Campus. Her PhD and postdoctoral work focused on Stem Cell Biology and Cancer at the University of Cambridge. After her PhD she went on supporting the development and implementation of the scientific strategy while working at the Experimental Cancer Medicines Centres Network at Cancer Research UK. Agnieszka combines an entrepreneurial mindset with interests in the life sciences, genetics and healthcare industry. Throughout the years of her academic and extracurricular work she got familiar with and actively involved in the Cambridge Cluster. During her PhD, she joined the Global Innovation Forum Ltd, where she acted as COO for Innovation Leaders Conference '14 and '15 bringing together industry executive, entrepreneurs, scientists and policy makers (hosting 300+ delegates from industry and academia) and set up the Imagine IF! Business Idea Competition. Agnieszka is a co-founder and director of WATT, a non-profit organisation promoting young women in STEM, biotech and healthcare.



**Jelena Aleksic** is a geneticist and serial entrepreneur, passionate about the potential of biotechnology to improve patients' lives. She brings significant commercial and business development experience and is leading PharmEnable's business efforts. She was the founder and CEO of GeneAdviser, an online marketplace for clinical genetic tests (now owned by the UK NHS). She also founded a life science and business strategy consultancy, SparkBio Ltd. She completed her PhD at the University of Cambridge in Genomics and Computational Biology and has an academic background in genome regulation and rare diseases.

