This South Korean Company is at the Forefront of AI-driven Drug Discovery

April 20, 2022 by Andrii Buvailo

There is a new generation of tech-savvy drug discovery companies, applying the power of artificial intelligence (AI) to accelerate and improve the most important stages of bringing a new drug to patients: target discovery, lead identification, preclinical research, biomarker discovery, and even clinical trials. Some of the companies of this type managed to build so-called "end-to-end" platforms, where different modules and systems are interconnected and operated in one ensemble. This leads to a new model of research -- platform-based drug discovery -- which is a big step towards truly industrial "conveyor-like" R&D. This is the future in the making.

Today we met with one of the leaders in this emerging field to learn more about what it takes to build an AI platform for drug discovery, and how this benefits the research community: Dr. Jinhan Kim is the co-founder of Standigm, a workflow AI drug discovery company funded by Pavilion Capital, an investor whose successes in AI drug discovery include Schrödinger and Insilico Medicine. Standigm has produced meaningful R&D outcomes with its partners, including global big pharma and research institutes.

Previously, Jinhan worked at the Samsung Advanced Institute of Technology (SAIT) after receiving his Ph.D. in AI from the University of Edinburgh. After witnessing the promise of AI drug discovery at SAIT, he co-founded Standigm with two of his SAIT colleagues.

How did you start the company? What was the grand motivation to venture into a challenging business of computationally-assisted drug discovery? (a bit of personal intro and story)

My first motivation was that I wanted to solve a difficult problem with AI, which is such a powerful tool, in the relatively unexplored area where humans, biology, and new drugs come together. The second was that in this challenging area, I believed drug discovery would be the most influential, fundamental, and especially business-competitive area in which to apply AI solutions.

What is the core of Standigm's technology platform? How does it operate, in a nutshell?

In a nutshell, Standigm has a workflow AI that can quickly catch targets and even create compounds when given new diseases. In terms of target identification, Standigm applies an algorithm to huge amounts of biological network data, allowing it to infer the connection mechanisms between various diseases and targets. In terms of compounds, Standigm applies an algorithm to design drugs in a chemical data space in which the intrinsic properties of numerous compounds and drugs were learned.

Your website reads that the company already has a pipeline of targets and lead compounds for such indications as Cancer, NASH, Parkinson's Disease, and Mitochondrial Disease -- including both internal programs and projects with third parties. What are some of the most notable projects that you have and what was the role of AI in those efforts? Was it mainly about saving time and cost of discovery, or did it bring value beyond savings?

Notable pipelines are AI-driven drug candidates which respectively target Parkinson’s disease and liver cancer. These are expected to enter the preclinical phase in 2022. Moreover, there are pipelines under L/O discussion with our customers, including AI-driven NASH drug candidates.

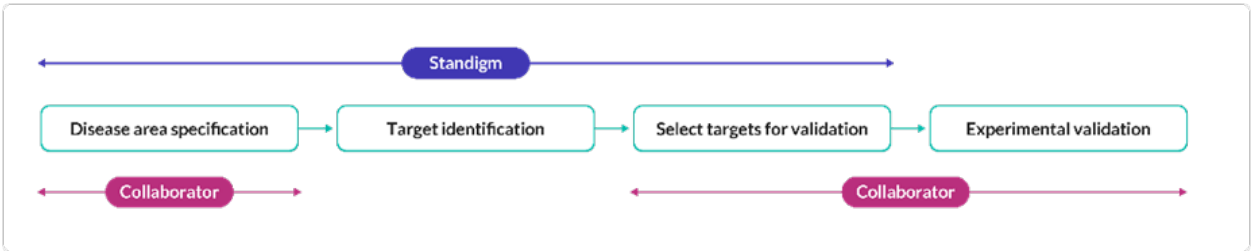
We think the role of AI in those efforts includes saving time and lowering the cost of discovery. With Standigm’s AI technology, drug discovery process can be finished three times faster and ten times cheaper. But above everything else, Standigm’s AI-based drug discovery can secure backup scaffolds that can enhance the project's success rate.

What is Standigm offering today for its clients? What is a typical collaboration scenario? Who are your primary clients today?

Basically, Standigm offers three types of collaboration.

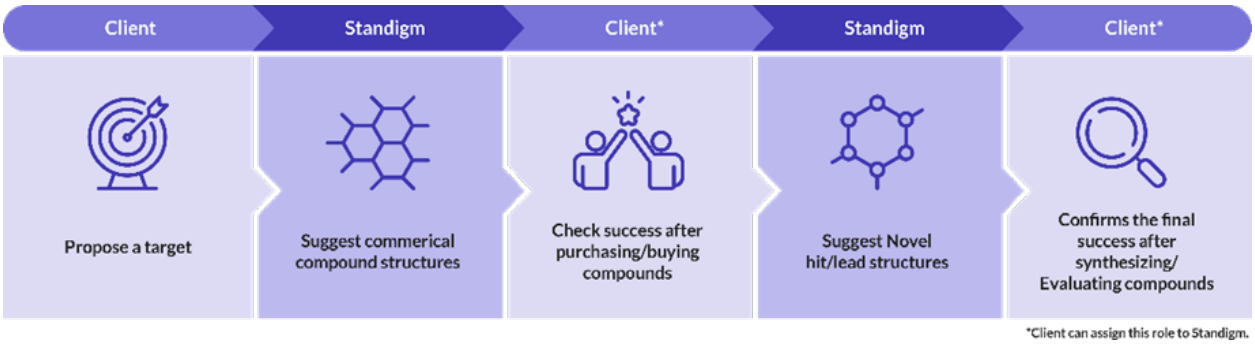
Firstly, research collaboration for novel target identification or first-in-class lead generation.

Standigm processes various biological data. This data includes Omics data generated under various experimental conditions and literature data accumulated by clients. The analysis can define data types and check data quality to build customized data for AI training. Standigm creates customized AI models for customers and provides novel targets.



If a client has its own unique target, collaborating with Standigm will make the client's drug discovery journey more efficient.

Standigm suggests commercially available compound structures that contain the client's target. The client checks whether the structures is successful after purchasing and evaluating the compounds. Standigm then suggests structures for novel hits/leads. The client synthesizes and evaluates the compounds to confirm final success.



Secondly, Standigm offers AI platform licensing opportunities for both target identification and first-in-class lead generation.

For example, we have recently contracted with a large European pharmaceutical company, which represents this type of partnership well. (See model below.)

Option		Licensing process				
Type		Target demonstration + Licensing (Licensing through the demonstrtion of the platform with novel target)				
R&R	Standigm	Disease specification	In silico target id	Select targets for validation	Experimental validation (optional)	
	Client					Decision on licensing
Input		· Specified disease · Any data related to the specified disease from the client				
Output		· Customized AI-based model (Standigm ASK™ for the client) · In silico novel targets from AI-based model				
Product & Service		Standigm ASK™ software license & demo/Training				
Period		Subject to contract				

Lastly, Standigm offers licensing-in or partnership with Standigm's ready-made therapeutic assets.

Our asset catalog, which can be found on our website, lists commercially valuable leads that have novelty and activity in place at the level of enzyme/cell. We can start a discussion with the name of any target for the lead a client is interested in.

We're working with big pharmaceutical companies and research institutes in Korea and outside Korea, including SK Chemicals, Hanmi Pharmaceuticals, Milner Therapeutics Institutes, US Biotech 'P', and a European pharma.

According to BiopharmaTrend report "The Landscape of Artificial Intelligence in Pharmaceutical Research", the community of AI-powered drug discovery companies is represented by **more than 350 players** across the globe, with dozens of companies in the area of target discovery and lead generation. What are the key competitive differentiators of your research platform making it a unique value proposition?

Drug discovery is not a field to be developed with a single technology but by a combination of various technologies from target discovery to compound development. Therefore, a spectrum of companies is needed, ranging from companies specialized in AI models that perform specific functions such as protein structure, drug binding prediction models, or virtual search models to companies that develop clinical candidates based on the entire drug discovery research process from target to compound.

Based on this general classification, the competitive differentiators of our research platform can be summarized as follows.

1. Standigm has end-to-end artificial intelligence technologies ranging from target identification to compound derivation. It has completed a scale-up that allows multiple projects to be carried out simultaneously to meet the needs of various new drug discovery efforts using AI technologies integrated into a single workflow AI. The ultimate goal of Standigm's AI drug discovery platform is to shorten the discovery period for new drug candidates from 2-3 years to 7 months. Standigm can develop first-in-class new drug candidates. In particular, the new drug target discovery platform is a type of technology developed by only a few leading companies. Through this, it can develop first-in-class drug candidates, new drugs with higher added value, drawing attention from global big

pharma.

2. Standigm is a company that offers value as a “package deal.” We offer not only AI platforms that can continuously generate assets, but also the assets generated by those AI platforms. Through our inhouse projects with workflow AI, several effective and leading compounds corresponding to first-in-class have been secured, and assets can be continuously secured in the future. This enables the expansion of our business model beyond the existing artificial intelligence platform-oriented cooperation model, creating more advantageous contract conditions through integrated package deals comprising the platform, initial drug candidates, and L/O of the drug candidate itself.

3. Beyond our own AI technology, we can also make our own assets thanks to our balanced manpower structure, which includes AI scientists, chemists, and biologists. In order to further accelerate the development of our assets, we have enhanced our capabilities in drug discovery by establishing our own synthetic lab, making Standigm’s AI drug discovery technology unique and more practical than others.

How did the pandemics affect your company? Do you have activity in the COVID-19 research space?

We are accelerating the discovery of novel anti-tubercular drug candidates with IPK (Institut Pasteur Korea) by conducting RIGHT Fund awarded projects. The RIGHT Fund is supported by the Bill & Melinda Gates Foundation. Also, we are collaborating with a European Research Institute to conduct research on novel drug discovery for viral respiratory diseases including MERS, SARS, and COVID-19.

What is your 2022 resolution? What are the grand goals that you could share?

In 2022, we will continue our AI drug discovery projects to draw initial drug candidates, which will lead to collaborations with asset L/O. In addition, as the competitiveness of AI drug discovery is valued at the level of new-drug commercialization, we will conduct clinical trials for a small number of our pipelines to show that the value of compounds derived from our AI platform can be maximized. In addition, we plan to carry out business and research activities in earnest with local corporations overseas (US, UK) to reach

more global customers.

- Standigm