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Dicerna

On November 18, 2021 the Danish drug giant Novo Nordisk has agreed to pay $3.3b for Dicerna, which was the largest biotech holding of the Technology of the Future Fund. The shares were up 78 % and we have closed our position.

Our research note from 6 November, 2021:

The company

Dicerna Pharmaceuticals, Inc. (DRNA), is a biopharmaceutical company using ribonucleic acid interference (RNAi) to develop medicines that silence genes that cause disease. Dicerna's proprietary GalXC technology is an innovative, subcutaneous RNAi platform that enhances selectivity and suppression of target RNA sequences. We consider the GalXC technology to be promising. We are encouraged by the company's focus on genetic drivers of hepatic disorders and the initial data provides tangible proof-of-concept for the platform. The company's partnerships with Alexion, Boehringer Ingelheim (BI), Lilly, Roche, Novo Nordisk, and Alnylam are further validation of the potential of the GalXC technology. These partnerships also offer economic interests across multiple therapeutic indications beyond rare and chronic liver disease.

Dicerna's business model is also of significant interest. It centers on the retention of commercial rights to core programs with opt-in rights to selected collaboration programs. For each core program, Dicerna may opt in after clinical data have been generated by the partner, limiting Dicerna's clinical development capital at risk in these programs. Upfront and milestone payments from these collaborations fund development and commercialization of Dicerna core programs.

The market

Dicerna's platform has sound potential, particularly within the orphan liver disease space where the company is focusing its internal development efforts. The GalXC™ platform currently aims to deliver therapeutic agents to liver cells. However, it also provides validation and enables economic opportunities across several therapeutic indications beyond rare and chronic liver disease.

In addition, the company is working on the GalXC™-Plus platform, intended to deliver RNAi-triggered molecules to other tissues.

Where our research differs from others

Dicerna's GalXC™ platform is designed to offer competitive advantage over traditional RNA interference platforms.

Despite the fact the company is at an earlier development stage than its competitors, we think Dicerna's platform has a significant competitive advantage compared to all main competitors in terms of the development of therapeutic agents based on RNA interference.

Traditional RNA triggers are double-stranded oligonucleotides that are designed to bind to an RNA-induced silencing complex or RISC. The RISC recognizes the target microRNA (mRNA) molecule and turns it off, causing the cell to lose its ability to produce the target protein.

The GalXC™ platform is used to produce a so-called Dicer-directed RNA trigger or Dicer-substrate small interfering RNA (DsiRNA). Unlike traditional triggers, the Dicer-directed trigger interacts with a Dicer protein, which controls the interaction of the trigger with the RISC (RNA-induced silencing complex). As a result, the efficiency and specificity of

trigger action are improved. **In particular, Dicer-directed triggers can be hundreds of times more efficient than a traditional trigger**. Structurally, a Dicer-directed trigger is a double-stranded oligonucleotide with a length that is several nucleotide pairs longer than a traditional trigger. In addition, Dicerna triggers have a loop in their structure, which ensures a more efficient interaction with Dicer proteins.

We think the company is a disruptor and is an acquisition target.

Literature:

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2) Rose SD, Kim DH, Amarzguioui M, Heidel JD, Collingwood MA, Davis ME, Rossi JJ, Behlke MA. Functional polarity is introduced by Dicer processing of short substrate RNAs. Nucleic Acids Res. 2005 Jul 26;33(13):4140-56. doi: 10.1093/nar/gki732

3) Kim DH, Behlke MA, Rose SD, Chang MS, Choi S, Rossi JJ. Synthetic dsRNA Dicer substrates enhance RNAi potency and efficacy. Nat Biotechnol. 2005 Feb;23(2):222-6. doi: 10.1038/nbt1051