biOasis

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Transcend: a natural way to cross the blood–brain barrier

By hijacking one of the body's own transport methods, biOasis has identified a natural route to treat disorders of the central nervous system.

Few challenges in drug development have proven to be as tough to overcome as crossing the blood–brain barrier. Deep-pocketed pharma companies have tried for years to come up with a solution to this problem, yet it remains a significant impediment to the treatment of diseases affecting the brain. The irony is that nature may have solved the problem millennia ago. Now, biOasis Technologies is ready to share its method with the world.

The blood–brain barrier is hard to cross by design. It acts as a shield for the brain, stopping anything that might harm the vital organ from making it beyond the blood. For drug developers, this means that 98% of small molecules and 100% of biologics are unable to reach targets within the brain. With central nervous system diseases affecting one in six people and the markets for disorders affected by the barrier being worth upward of $100 billion a year, there is an open opportunity to improve these figures.

Having seen others try and fail to solve the problem by disguising drugs with lipophilic molecules or using compounds to boost the permeability of the barrier, biOasis struck upon the idea of hijacking the body's own transport system to access the brain. This idea led the company to melanotransferrin, a protein that attaches to receptors on the endothelial cells that form the blood–brain barrier. Upon attachment to a receptor, melanotransferrin is shuttled through the endothelial cell and into the brain to deliver iron. Turning this system into a functioning delivery route has taken years, but biOasis now thinks it has an effective approach. Most important, it has independent validation to back its claims.

Turning a natural process into a drug delivery system

biOasis and the researchers at the University of British Columbia have spent over 20 years figuring out how to turn melanotransferrin, a large protein, into an effective drug delivery system. The work led to Transcend, a method that can use either melanotransferrin or specifically the peptide portion of the protein to deliver drugs across the blood–brain barrier. biOasis discovered that instead of attaching drugs to the large melanotransferrin protein, it could pair them with a peptide that is just 2% of the size of its parent protein. As biOasis tested the peptide further, it found that it crosses the barrier more efficiently and persists in the brain longer than its parent protein.

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>
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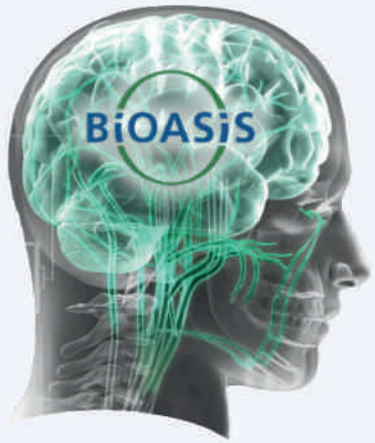

biOasis, solving the challenges of the blood–brain barrier.

The data to support these claims are from tests in animals, but there are reasons to believe that the performance will be replicated in humans. First, blood–brain barriers in rodents and non-human primates are very similar to those in humans, so it is likely that products developed by biOasis will behave similarly once in clinical trials. Second, and unusual for an early stage biotech, biOasis has a wealth of independent validation from human-based *in vitro* and *in vivo* models to support its claims. The firm has deliberately worked with the likes of the National Research Council of Canada, pharmaceutical companies and universities to obtain this validation and gain credibility.

Having access to an innovative, independently validated solution to a hoary problem—one that can also help extend the patent life of existing drugs—has put biOasis on the radars of leading biopharma companies. AstraZeneca's biologics wing, MedImmune, has entered into a licensing deal, leading to the generation of more independent data to demonstrate the effectiveness of biOasis' technology. Others are set to follow. biOasis expects to sign technology access deals with multiple companies.

Such arrangements allow companies to test the technology to confirm what biOasis, MedImmune and others have already ascertained: that the drug delivery system holds immense promise. Once other firms have spent time generating their own data to demonstrate this fact, biOasis anticipates that they will sign full licensing deals. "We at biOasis are very proud of the accomplishments we have made to date. From concept, through research, to validation and now into commercialization, we've made the careful steps to ensure that the hopes of being able to provide a solution to the blood–brain barrier are now within our grasp," said Rob Hutchison, CEO of biOasis.

Making crossing the blood–brain barrier mundane

The signing of such licensing deals is of the utmost importance to biOasis, which sees itself as more of a technology platform provider than a traditional biotech. Taking this approach will allow the delivery system to be applied to a far broader range of therapeutic fields than would be possible if biOasis kept the technology for itself. biOasis foresees its science being used to deliver drugs to treat a wide spectrum of central nervous system disorders, including brain cancers, pain and metabolic disorders, and neurodegenerative diseases. Data are available to support these ambitions.

MedImmune has shown that fusing an interleukin 1–receptor antagonist to biOasis' peptide facilitates transport across the blood–brain barrier and the induction of analgesia. Such early indications of efficacy, which have been demonstrated with multiple drugs, set biOasis apart from others in the field. These data are part of a growing pool of independently validated research showing that Transcend can take biologics and small molecules across the blood–brain barrier, keep the active ingredient around the target cells for a prolonged period of time and have an effect on hard-to-treat diseases.

This process is a unique discovery in the many years of research into crossing the blood–brain barrier. If the next few years go as biOasis hopes, accessing the blood–brain barrier will become mundane—a challenge consigned to history.

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