Complex sugars could treat serious illnesses

Spin-out company IntelliHep1 has developed new therapeutic applications for complex sugars (glycans) found on cell surfaces which are already used for preventing blood clots. Glycans, such as heparin and heparan sulphate, act by binding to proteins and regulating their biological activities. This property has potential biomedical applications in the treatment of, for example, Alzheimer’s, cancer, spinal cord repair, cardiovascular disorders, infectious diseases, inflammation and wound healing.

IntelliHep was founded by Professor Jeremy Turnbull2 and colleagues Dr Andrew Powell and Dr Ed Yates. Originally, the research team was based at the University of Birmingham, but in 2003 all three relocated to the University of Liverpool. The company grew out of BBSRC-funded research and studentships dating back to 2000.

The idea for the business was developed with the assistance of a Biosciences Business Plan competition held by BBSRC, in which IntelliHep reached the finals. After the move to Liverpool, further development of the business idea was undertaken with the assistance of Merseybio Incubator – a state-of-the-art biosciences facility designed to encourage the growth of spin-out companies3.

Impact Summary

Spin-out company IntelliHep is developing new therapeutic applications for complex sugars found on cell surfaces.

The company now employs four people part-time and has annual turnover of approximately £100,000.

Intellihep has recently taken an exclusive licence on a patent from the University of Liverpool for novel BACE (beta-site APP-cleaving enzyme) inhibitors developed from BBSRC-funded research.

The potential markets for heparin-based therapeutics are large – especially as applications reach into areas of significant unmet clinical need, such as metastatic cancer and Alzheimer’s disease. For instance, market research reports suggest the market for therapeutics to treat Alzheimer’s disease will grow from $5.4Bn in 2010 to $14.3Bn in 20204; the market for anti-cancer drugs was around $75Bn in 20125; and the market for wound care drugs in 2012 was around $16.8Bn6.

Intellihep has developed a proprietary platform technology for the production of semi-synthetic heparin-based...
glycan ‘libraries’. These molecular libraries can be screened for activity and also enable active glycans to be identified, helping in the discovery and optimisation of novel compounds. The company is using its expertise to develop a pipeline of leads from academic research at the University of Liverpool, and has four part-time employees and an annual turnover of approximately £100,000.

“We’re really excited about the potential of the compounds as a novel class of therapeutics for a range of medical applications. Over the years, we’ve been establishing a solid base for the company by the generation of revenue from collaborative partnerships,” says Professor Turnbull. “Recently, we’ve taken our first exclusive licence on a patent from the University of Liverpool. This is for novel BACE (beta-site APP-cleaving enzyme) inhibitors – developed from our BBSRC-funded studies. These compounds are inhibitors of the protease BACE and hold out a promise for treatment of the underlying cause of Alzheimer’s disease.”

International collaboration

IntelliHep has formed a partnership with specialists on carbohydrate chemistry at Callaghan Innovation in New Zealand – a government research agency with world class carbohydrate synthesis expertise. The partnership is enabling IntelliHep to tap into Callaghan Innovation’s expertise, work in collaboration with its partners and clients, and produce fully-synthetic drugs.

Dr Peter Tyler, a programme leader at Callaghan Innovation, is collaborating with Professor Turnbull on research into novel synthetic chemistry to generate specific heparan sulfate oligosaccharides. “Having realistic plans for the commercial uptake of products arising from our research is an essential component of successful bids for funding,” says Dr Tyler. “With IntelliHep as our commercialisation vehicle, we’re able to gain funding and plan for development of potential drug candidates.”

During 2013, IntelliHep is seeking to obtain seed investment to support its business development plans and expansion of the leads pipeline. Commenting on the company’s future prospects, Professor Turnbull says they are hoping to extend their pipeline through further licensing of university-developed patents on novel heparin-based compounds. “These are very important because they can inhibit cancer metastasis and promote spinal cord repair. It’s an exciting prospect for IntelliHep.”

Notes and references

1. [Reference/webpage no longer available – Feb 2016]
2. www.liv.ac.uk/integrative-biology/staff/jeremy-turnbull
3. [Reference/webpage no longer available – Aug 2017]
4. [Reference/webpage no longer available – Feb 2016]
5. [Reference/webpage no longer available – September 2018]
7. www.callaghaninnovation.govt.nz
8. www.irl.cri.nz/peter-tyler

Selection of recent peer-reviewed journal articles about the work of IntelliHep:


