

Interview with Mercia and Medherant

Capital start for Warwick University spin-out

As universities have become better at organising their theoretical research into commercial propositions, intermediaries have appeared on the scene to nurture their research until it is ready to be commercialised.

An example of this is Mercia Technologies Plc, which is the result of a series of transformations from a classic venture capital fund to an incubator-oriented operation that provides capital, infrastructure and management. It is tailored specifically for translating university research into companies with commercial products by helping them at the pathfinder and seed stages and onwards until the project becomes irresistible to industry buyers or until the project can generate enough cash to stand alone. Sometimes, this approach involves helping a fledgling company for more than ten years, in contrast to the classic venture capital funds that aim for an exit after five years.

In this decade, Mercia has been able to take advantage of UK government tax incentives that provide individual investors with important tax breaks for investing in start-up companies. Under the management of Mercia Fund Management Ltd, wealthy individuals provide the early-stage seed funding while bigger commitments later on are provided by Mercia Technologies from its own resources and institutional shareholders.

Mercia has non-exclusive contracts with 14 universities, many of which are in Britain's Midlands, a region in central England that broadly corresponds to the historical Kingdom of Mercia. The 14 universities range from Warwick University in the West Midlands to Leicester University in the East Midlands, up to York University and Liverpool University the North. It also has contracts with a few Scottish universities, such as the University of Strathclyde in Glasgow.

To better understand how Mercia works in practice, the *MedNous* editors talked to Nicola Broughton, investment director at Mercia Technologies, and separately to Nigel Davis, chief executive officer of Medherant Ltd, a Warwick University spin-out that Mercia is funding. The interviews took place on 1 February. Medherant is developing a transdermal patch that could be used to deliver ibuprofen to patients and other medicines as well.

"The idea behind the whole [Mercia] model is to take a university spin-out, such as the Medherant case, and take it from that very early stage where they may be looking for a couple of hundred thousand [pounds], right up to exit," Dr Broughton said.

Mercia's model is unique in that it goes well beyond the typical venture capital cycle to align with the requirements of the originator of the technology. University projects can

take up to 15 to 17 years to reach their commercial potential, therefore there needs to be a different vehicle for these assets, she said.

"What we do is nurture these early-stage companies year on year in our fund management portfolio which has about 45 [companies] sitting there at the moment," she said.

Once the university spin-outs reach a point where they have some internal strengths, such as income from sales or a major deal with a corporate partner, the investment is turned over to Mercia Technologies, which invests directly from its balance sheet.

"We raised £70 million on AIM [the London Stock's Exchange's Alternative Investment Market] in December 2014 to do just that," Dr Broughton said.

The *MedNous* editors first met the executive team of Medherant in November 2015 at a biotechnology industry

meeting in Munich, Germany where they made a presentation about a transdermal patch for ibuprofen, which they said could deliver the drug at a steady rate for 12 hours, making it suitable for night-time administration. Ibuprofen is currently sold as a topical drug but there is no patch technology for the medicine.

The inventors of the technology, led by the Warwick University Professor David Haddleton and the university's technology transfer arm Warwick Ventures, saw a market opportunity for a new patch. This was based on their years of experience working with polymers. They brought in Mr Davis and Nigel Theobald, both people with

commercial experience, to discuss the options. This led to the launch of Medherant with Mr Davis as CEO, Mr Theobald as a director, and Prof Haddleton as the chief scientific officer.

Medherant's patch is called TEPI. It is a transparent adhesive that can deliver prolonged doses of a drug directly through the skin. Prof Haddleton and colleagues found a way to incorporate the drug into a polymer matrix that sticks the patch to the patient's skin. The patch incorporates polymer technology developed by the global adhesive company Bostik and exclusively licensed for transdermal use to Medherant.

According to Dr Broughton, Medherant had several things going for it when it made its pitch for money. First, it was relatively advanced with its business plan and even had a chief executive. Secondly, it had a revolutionary idea and thirdly, it had the potential for generating earnings early. While Mercia generally will not invest in medical therapeutics on the grounds that they are too risky, it was happy to invest in the patch because of the potential market opportunity. Like all drug developers, Medherant will need to do clinical trials before it can launch a first product.

Mr Davis said that Medherant will be seeking scientific

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Nigel Davis

advice soon from the regulatory authorities on the clinical trial requirements for the ibuprofen patch and follow-on products. It is expecting to do trials for each new product in order to obtain safety and efficacy data.

The patch could potentially be used to deliver a number of different types of medicines, assuming the active ingredient is suitable for topical administration. This excludes biologics. But it includes drugs that are already delivered through a patch, such as nicotine, and those that are not. "There are about 30 [candidate] drugs and we have tried most of them. Seventy-five or 80% of them dissolve in our adhesive. And all of those that dissolve come out again across the artificial membrane. We can vary the rate that they come out by changing the concentration, but also by adding excipients that might change how it comes out of the adhesive," the executive said.

Medherant has chosen ibuprofen as its first product because it has an established safety profile, wide distribution and no patch technology. It is also relatively easy to produce. "We buy the ibuprofen and stir it together with the polymer, then put on the backing and there is your patch ready to go. The manufacturing is quite straightforward," he commented.

Initial financing

Medherant's initial financing from Mercia came from one of its seed funds. These funds are aimed at wealthy individuals who can benefit from investing in companies that qualify for the UK government's Enterprise Investment Scheme and its Seed Enterprise Investment Scheme.

By investing in companies that qualify for the seed funding (SEIS) or early stage funding relief (EIS), the funds provide tax benefits that can include income tax relief, inheritance tax relief, loss relief, capital gains tax exemption on exit, and exemption or deferral of capital gains realised on sales of other assets.

Needless to say, the risk of the growth funds is high but so is the reward. Since 2012, Mercia has launched four growth funds and is gearing up for a fifth in April. According to an information memorandum for the fifth fund, the objective of the fund is to obtain a 10% to 50% compound annual rate of growth. The performance of the earlier funds varies between a 25% annual rate of return and 59%. If the tax advantages are included, an annual return of as high as 108% was obtained. In one case, the portfolio company Abzena, which provides services to the pharma industry, produced a return to investors of 170% after going public in 2014.

"We are discussing additional funding with Mercia at the moment," Mr Davis said. He said that the plan is to get money from Fund 4 before the end of March and he is already discussing with Mercia the possibility of obtained funding from Fund 5 as well.

The objective of Medherant and that of Mercia as well, is to have quick and easy negotiations so that the company can get on with business development. "They know how well we are doing, we know where we are at, and we do not have to go out on the road and take an inordinate length of time negotiating the next round because we are actually in the middle of a huge amount of business development activities, talking to pharmaceutical companies," the executive said. At the time of the interview, Medherant had already signed confidential disclosure agreements with about 15

pharmaceutical companies.

As part of Mercia's funding arrangements, Dr Broughton sits on the Medherant board as does Warwick University via its technical transfer office. Warwick University does not own any of Medherant's patents so its remuneration will come from its shareholding.

While some of Mr Davis' time is taken up by future financing, most of his energies go into talking with companies that might be future partners, including the 15 or so with whom Medherant has already exchanged confidential information.

He is looking for partners that can market and distribute the patches but only in some cases will he need help with manufacturing.

Future options

"Model-1 for ibuprofen is that we control the manufacture, but when we work with companies on their own NCEs (new chemical entities) it is likely that we end up transferring the manufacturing to them. But that is for future discussion. We are open for both models.

"With ibuprofen we may not have a single global licensee. If you actually look at it, it is not obvious who that should be because nobody is strong in this type of product everywhere. So we can envisage having two, maybe three or more partners."

He said that one of the reasons he is talking to so many companies is that some of them are interested in ibuprofen, but other companies are interested in other products.

"We are not quite at the stage of learning what the NCEs are that they want us to look at, but we are getting close to that. At the moment they are just finding out about the breadth and character of what are the parameters of what we can do and what we can't do, and then they will know what to disclose to us."

Mr Davis said the TEPI patch is suitable for the life-cycle management of existing products. For instance, when a product is approaching the end of its cycle, switching to patch delivery could prolong its life.

However, what is more interesting is the possibility of enabling the creation of a new product. He said his patch might obviate problems with a drug that is stuck on the shelf in a company laboratory because of severe gut toxicity or it might be too expensive if 90% of the drug gets destroyed in the gut.

There may also be opportunities for improving existing patch technologies. For example, Novartis produces a patch product for treating Alzheimer's disease called Exelon which generated sales of \$728 million in 2015.

Over the next five to 10 years, Medherant expects to have its own pipeline – some products through partnerships and other developed in-house.

This article was prepared by the *MedNous* editors from interviews with Nicola Broughton of Mercia Technologies Plc and Nigel Davis of Medherant Ltd on 1 February 2016.