

## WHAT IS PROTEOMICS?

**Proteomics is the large-scale study of proteins**, particularly their abundances, distribution, structures and functions. The term “proteomics” was coined to make an analogy with genomics, the study of the genes. The word “proteome” is a portmanteau of “protein” and “genome”.

Proteomics is considered the next step in the study of biological systems, after genomics. It is much more complicated than genomics, mostly because while an organism’s genome is constant, a proteome differs from cell to cell and constantly changes through its biochemical interactions with the genome and the environment. One organism has radically different protein expression in different parts of its body, different stages of its life cycle and different environmental conditions.

Scientists are very interested in proteomics because it gives a much better understanding of an organism than genomics. Since proteins play a central role in the life of an organism, proteomics is instrumental in the discovery of biomarkers, such as those markers that indicate a particular disease.



## SCIENTIST, ANALYST, ENTREPRENEUR

“I didn’t really set out to run my own business,” Dr Stephen Osborne, MD of East Sussex Enterprise Hub client Pastel Bioscience explains. “I thought I had a great idea and I wanted to develop it. I started the business to support the idea, rather than the other way round.”

### BIOMARKING THE WAY

If you think this seems a bit unusual then perhaps it is. But Dr Osborne is unusual, and his company too. Pastel Bioscience has developed what it claims is revolutionary technology that will help pharmaceutical companies discover the next generation of drugs. The technology works by allowing the accurate identification of “biomarkers” associated with the early [sometimes very early] stages of disease. It could provide much more than a set of advanced health ‘warning lights’ however, complex combinations of proteins could be indicative of health risks many years before they become acute, or even noticeable by current means.

One developing area is ‘personalised medicine’, where the technology could allow a doctor to screen a blood sample for protein biomarkers. The results could give accurate predictions about the diseases you are likely to develop in the future, allowing your doctor to prescribe (or just as likely proscribe) for ailments you don’t even have yet.

### PROTEOMICS

The human body contains between 20 and 30 thousand proteins. Their study and use, is a young but fast-developing area of science called “proteomics” [see inset]. When you begin to develop a disease, the levels of at least some of these proteins will change. These patterns of protein level change – biomarkers – are reliably indicative of a particular disease, if you can identify them.

This, however, is where it gets a bit sticky, as Dr Osborne explains. “Unfortunately, the available technology doesn’t allow you to look at all the 30,000 proteins in the body; the best it can do is give a snapshot of particular groups of proteins, which might not give you a reliable diagnosis for a particular disease. The technology that Pastel is developing will allow a test to identify all of the proteins within diseased cells, so it will give you the best biomarkers for that particular disease. The instrumentation and the reagents Pastel are developing will be used by the pharmaceutical industry to discover the biomarkers for a particular disease. Once they’ve discovered this, they can develop a test format that’s easy, fast and accurate enough to be used at a GP’s surgery, for example.”

The impact, if everything goes to plan, could be enormous. Where biomarkers are particularly useful is in the area of early detection. Up to now detection of serious chronic illnesses such as Alzheimer’s and Parkinson’s, and of some cancers has been difficult, but the use of multiple protein biomarkers would allow doctors to identify the onset of these diseases very early. Early intervention means a much better prognosis for the patient [and the likelihood of a much cheaper treatment regime for the NHS].

### HUB INTERVENTION

Initially the Hub involvement with Pastel was limited to giving the company access to market research that they would not otherwise have been able to afford, but recently Jim Christy at the East Sussex Hub involved Pastel with an Enterprise

Hub Network scheme that is being piloted called “Hub Intervention Managers”. This puts a temporary team of experienced business people around an entrepreneur to strengthen the commercial proposition. “It’s been quite an eye opener,” says Dr Osborne, “Obviously it’s not guaranteed that we’ll raise the finance we’re looking for, but I think the Hub Intervention Managers scheme has improved our chances, and we’ve learned a lot.”

East Sussex Enterprise Hub Director, Jim Christy, commented, “We helped Stephen with patent searches through the British Library’s Business and Intellectual Property Centre as well as sourcing market research reports. We worked with Pastel on its successful PoCKeT proof of concept funding application to Finance South East, securing the

# \$200m

contract research and licensing deals on discovered biomarkers.

# \$1bn

forecast growth of the market by 2010 [Kalorama report, Jan 2007]

2002

\$1.4 BN

2010

\$10 BN

2015

\$18 BN

The proteomics market, comprising reagents, bioinformatics software, and instrumentation such as 2-D gels and the mass spectrometry equipment employed in biomarker discovery, was worth **\$1.4 billion** in 2002 and is forecast to reach **\$10 billion** by 2010 and **\$18 billion** by the year 2015 [ResearchandMarkets report, Apr. 2006].

company £50,000, and signed the business up to our Intervention Management Programme, and we fully expect this will accelerate his routes to market.”

### THE MAKING OF AN ENTREPRENEUR

Graduating in Biotechnology from the University of London, Stephen Osborne went on to complete a PhD, then worked in a biotech start-up, and for seven years for a European diagnostics company. In 1997 his career took an unexpected turn when he was headhunted back to the UK to join a City stockbroker as an analyst, specialising in the biotech and healthcare sectors. “It’s proven to be an invaluable experience – but I’m a scientist at heart. Back in 2000 I had an idea – I’d just written it down, literally, on a piece of paper. I knew it was a good idea, I thought it could be groundbreaking, and I knew I couldn’t develop it working as an analyst.”

“As a scientist I wanted to develop this idea, but as a businessman I had to decide how to do it.”

Starting a business just to run with an unproven idea in a new technology area might seem a bit risky, but Stephen thinks there was no other way. “As a scientist I wanted to develop this idea, but as a businessman I had to decide how to do it. I could have talked to the big pharmaceutical companies,

but with my background as a financial analyst I knew that these sorts of ideas – very early stage ideas – just aren’t taken up by big business. So I had to run with it myself.”

So Dr Osborne quit his well paid job and spent the next two years writing a business plan, registering patents, and “at the end of the dotcom boom,” he says ruefully, he set about raising finance. The timing proved crucial – though not in a good way.

“Whereas I’d initially hoped to raise a million pounds or so to set up some dedicated labs, I wasn’t able to do that as [in the post-dotcom period] I could only raise £250,000.”

### SPINNING IN

That’s still pretty impressive in the ‘hangover’ period of the early 2000s, but it did mean that Pastel had to scale back its ambitions. Dr Osborne eventually settled on the University of Sussex – it had a very good protein engineering group and the University agreed to give him space within a lab and access to the instrumentation at minimal cost. In return they took a part-equity in the company – in effect Pastel span into the University!

The future is all about realisation. “We’ve got proof of principle that the technology works, so the

challenge at the moment is to scale up. I would like to raise £3-5 million but again it could be difficult. That would fund the company for about three to four years.”

Unfortunately for Dr Osborne, that will mean more time away from the lab, “I’m a scientist and I’d like to be in the lab all time, but I know that to keep the company going forward I’ve got to put my marketing hat on, my CEO hat on and sell the company to the Venture Capitalists.

“Knowing how to get the balance between doing the research and selling the company is the key; effectively I’ve been researching that at the same time as researching the technology.”

### For more information:

[www.pastelbioscience.co.uk](http://www.pastelbioscience.co.uk)

[www.eastsussexhub.co.uk](http://www.eastsussexhub.co.uk)

“The Hub worked with Pastel on its successful PoCket proof of concept funding application, securing the company £50,000.”

# BUSINESS PROBLEMS ANSWERED

Every Enterprise Hub business is unique, but certain challenges are common to every business – and some questions crop up again and again. We asked three Enterprise Hub Directors to choose a question they’ve been asked more than a few times, and give us a quick answer...

## Why aren’t people buying my product?



GETTING YOUR SALES AND MARKETING RIGHT IS CRUCIAL TO THE SUCCESS OF YOUR BUSINESS, SAYS EAST SUSSEX HUB DIRECTOR JIM CHRISTY.

To make sure you’re making the most of your sales and marketing opportunities, you’ll need to identify your customers and work out what they want from you, and what makes your product or service special. Writing a marketing plan will help you to do this,

but you’ll need to have a clear idea of your objectives.

You’ll probably discover that you don’t know as much about your market as you need to, so you’ll need to start thinking about market research, and how to use it to gain an insight into your customers and how to interpret your findings to develop your business.

In addition to that you’ll need to understand your competitors – what do they do well and how you can differentiate what you do. Finally you need to think about how to reach your customers effectively – understanding all the possible sales channels, which ones are right for your business and developing the appropriate methods to tackle each one are all key stages in winning those vital orders

Your local Enterprise Hub will be able to advise you on all these issues, and point you in the direction of other help and support.

### FOR MORE INFORMATION:

Contact your nearest Enterprise Hub [see back page]

## Where and how can I get the cash to grow my business?

THIS IS A PERENNIAL QUESTION FOR HIGH GROWTH COMPANIES. ONCE THE INITIAL “3Fs” (FRIENDS, FAMILY AND FOOLS) FUNDING SOURCES HAVE BEEN EXHAUSTED, CASH HUNGRY COMPANIES HAVE TO TURN ELSEWHERE, BUT THE TYPE OF FUNDING YOU RECEIVE CAN HAVE AS MUCH EFFECT ON YOUR BUSINESS AS THE AMOUNT, SO YOU NEED TO CHOOSE CAREFULLY, SAYS THAMES VALLEY HUB DIRECTOR ED COOPER.



If you think now is the time for your business to consider refinancing, you should:

- Define a clear business strategy for growth
- Prepare your business plan to reflect your strategy and sell your proposition to potential investors [your local Enterprise Hub Director can help you with this]
- Develop a succinct punchy presentation/pitch focused on market need and why customers will buy your product/service
- Take on board advice and feedback. Use the Enterprise Hubs Investment Readiness

programme and others as sounding boards

- Use networks in a considered manner to get to potential backers – Business Angels, banks, grants, VC’s etc.

Your Enterprise Hub in partnership with Finance South East will be able to help with this process, determine your likely funding sources and put you in touch with relevant people.

### FOR MORE INFORMATION:

Finance South East [www.financesoutheast.com](http://www.financesoutheast.com)

## Should I and how do I protect my idea?

IF YOU’VE GOT A GREAT BUSINESS IDEA, YOU’LL WANT TO KNOW HOW TO PROTECT IT IF THIS FITS YOUR PLAN FOR MARKET EXPLOITATION, SAYS SITTINGBOURNE HUB DIRECTOR, JOHN DODD.

It may be that you have few avenues open for protection, and the main issue is to develop a strong brand quickly but this will depend on your aims for your product i.e. are you building a company to trade or looking to licence the idea on [it’s difficult to compare a start-up Biotech company with a new retail product business]? Remember the best use of limited available money may be to get quickly into the market rather than to develop patents that you cannot afford to defend. However, for many the following are the areas to consider sooner rather than later:

- **Trademarks:** protect trade names, company names and logos.
- **Patents:** protect new and innovative inventions.
- **Copyright:** protects original literary, dramatic, artistic or musical work.
- **Database right:** protects databases that have taken time, money or effort to establish.
- **Registered designs:** protect the design element of whole or part of a product.
- **Design right:** protects the appearance of functional products with no aesthetic appeal.

Adequate protection of these will give your company its best chance of gaining further investment, licence opportunities and will maximise your chance of earning money from your idea/product for longer.

Protecting your Intellectual Property (IP) can be a complex business, and you should consider seeking professional advice before deciding how to proceed. You can get specialist advice from the Enterprise Hub IP Support Service; ask your local Enterprise Hub Director

### FOR MORE INFORMATION:

Enterprise Hub IP Support Service, through your Enterprise Hub