RIGHT CHEMISTRY

When Emily Humphrys and Alison White found interest wanting up the line at the high-tech firm they worked for, they bought it out and re-planted it in the North East. The outcome is impressive, finds Brian Nicholls

We're the sole place in England which is supportive of the type of work Alison White, Emily Humphrys and their small, thriving company carries out.

A recent Mori poll suggests the North East is the only area where the public shows a growing positive acceptance of industries working with chemistry, and our region is pumping investment into White and Humphrys' enterprise to encourage it.

Perhaps the presence of ICI, Europe's biggest chemical complex, for more than eight decades made us acquiescent. Perhaps it's our determination to turn chemistry to the good of our region's health, where it has sometimes been to its detriment before.

It may be our awareness that life sciences offer us major new economic opportunity; or it may stem partly from the persuasion practised by Nepic, the North East Process Industry Cluster.

Whatever the reason, we find the North East providing more than a third of the UK's gross domestic product generated by the pharmaceutical industry - that £2bn giving work to 5,000 people like Humphrys and White's employees in our midst.

Their Cambridge Research Biochemicals (CRB), at this point, employs only 15, yet from its modestly sized unit, looking fit to burst its seams on Belasis Hall Technology Park in Billingham, CRB epitomises enterprise - not only in the custom manufacturing of peptides and antibodies for medical research, but also as a new-era industry.

Pointedly, it's creating jobs for highly qualified people - jobs the like of which One North East and the regional CBI say are vital to help close England's North-South wealth and earnings divide. Most of CRB's staff are graduates, many with an MSc or PhD qualification. And commercial director Humphrys says delightedly that within the past two years suitable job applicants have been found within the region.

CRB is a producer, not a researcher. But as Humphrys explains: "Even in commercial roles you must be a scientist to sell your product technically. Earlier, our people came from other areas of the UK. Now they're coming from Newcastle and Durham Universities, where networks have been formed."

The firm's custom peptides and antibodies serve researchers in universities, biotechnology and pharmaceutical drug companies. They are the scientific detectives' research tools, fostering an understanding of the interaction of proteins in diseased states, whether cancer, Alzheimer's or cardio-vascular: "Every human disease you can think of," says Humphrys.

So contributors to CRB's estimated £1.2m annual turnover include multinationals such as Pfizer, GlaxoSmithKline, AstraZeneca, Novartis and Sanofi Aventis. "We're not short of customers," she says.

About 33% of product is exported: 24% to the USA and 9% to mainland Europe. Since most US competition is on the West Coast, CRB concentrates on the East Coast corridor, where its historic associations with Wilmington, North Carolina, date back to its earlier associations with Zeneca.

Other clients include the Medical Research Council and 50 or so universities in the UK and Ireland enagaged in medical research, including Durham and Newcastle. The world of academia is a major sales target.

CRB gained its present form through White and Humphrys' management buyout in 2000, though its origins lie in a Cambridge Research Biochemicals set up as a peptide manufacturer at Cambridge in 1980.

Stemming from the world's second oldest peptide company (after a Swiss firm) CRB can claim by descent to have been one of the first to commercialise its method of synthesis used in manufacture. A few years after the original start-up, it also began producing custom antibodies, which are detection tools for human diseases.

In 1989, both researching and providing, CRB was acquired by ICI. The business relocated north to Cheshire and Teesside. Now, under White and Humphrys, and with a recent £34,000 grant from One North East, CRB is expanding production at Billingham with a £100,000 investment in total. A new chemical synthesiser will raise production.

This machine, enabling hundreds of peptides to be made simultaneously on a sub-micro scale, will also enhance the supply service substantially. Two more chemists are being recruited and, as the company's 30th birthday approaches, Humphrys says: "We're optimistic. We're aiming to become the UK's number one specialist for research peptides and antibodies and first-choice supplier. We're also intent on increasing exports."

Ian Williams, director of business and industry at One North East, affirms: "CRB prides itself

Optimistic: Alison White and Emily Humphrys aim to grow their Cambridge Research Biochemicals to become a first-choice supplier

on working closely with customers in developing custom products. Its latest investment will strengthen this section of the business."

Humphrys and White met in 1990. Humphrys, from Teesside, had joined ICI as a radio chemist. White, from Sheffield, was operations director. "I wasn't suited to a purely technical role and aspired to a job offering greater contact with people," Humphrys says. "I did about four years as an organic chemist, but I was desperate for a commercial role and eventually I got a job in sales and became UK account manager.

"My boss was in the North West, where the peptide work was done. I got moved across there, did that for a couple of years, then got a transfer back to Billingham where my husband worked for ICI."

In 1999, production moved from Northwich to Billingham. "They were expanding other parts of the business and needed more space in which to grow the large-scale manufacture of peptides. So customs products, the small-scale operation - our bit - had to move out," Humphrys recalls.

It became apparent to her that strategic management was more interested in the large-scale peptide arm. A proposal was made and accepted to buy out the smaller lab-scale peptide operation from its parent, by then Zeneca (ICI having split in two).

That same year, another rebirth: Zeneca Pharmaceuticals division merged with Astra of Sweden to form AstraZeneca. The agro-chemicals division of Zeneca merged with Novartis Agro-chemicals to become Syngenta. Finally, the specialities division of Zeneca became Avecia under another MBO. This is now nearby in Billingham too, a contract manufacturer of protein-based drugs. The large-scale peptide operation CRB was previously tied to closed down in 2004.

Humphrys, having broken into sales, then wanted to run a company. "It's what gave me the idea to approach my boss about an MBO."

White, for her part, says: "I was very excited about owning a business I had worked in passionately in for 15 years."

She had joined CRB the day before her wedding. After ICI acquired CRB she was offered the post of production supervisor >>,

moving to Northwich. "That was short-lived. My husband was offered a post as lecturer at Newcastle University, so I needed to move to the North East.

"I wonder now whether destiny had a hand in this. I was immediately offered a role with a group making radiolabelled peptides, and there I met Emily."

Humphrys and White inherited the North East location, which offers advantages. Staff turnover is low, overheads too - five to 10 times below Cambridge in rents alone.

Travel between and home and work is easy, and besides One North East's grant and other support, there's the presence now of Nepic - the North East Process Industry cluster - and the Centre of Excellence for Life Sciences (Cels) both with networking.

The management team now also includes a non-executive chairman, Dr Steven Powell of Plethora Solutions. As Humphrys points out: "We wanted someone in this role with a lot of business acumen, especially financially. He has been a venture capitalist himself, can advise on how to take the business forward and is in a world apart from ours.

Also, unlike Alison and I, who are chemists, his background is in biology, and as all our products are chemically made, we sell to biologists.

"It's great to have someone push you much harder. He's a mentor, he's good on the legal side and sometimes he plays devil's advocate. Also, because Alison and I are two equal owners, we didn't ever want to get into a gridlock."

Peptides is a market growing by about 15 to 20% a year, and Humphrys and White say they're happy to be in peptides till they die.

There will be challenges shortly, though. While the weaker pound will help exports – hence attention intensifying towards the USA, Scandinavia, France and Germany - recession looks sure to hit the government-funded public sector's spending in universities and medical research at home.

"If their budgets are cut that will affect us for a while," Humphrys says. "We're trying to mitigate that by increasing our customer base across different sectors."

Since we, the public, care more than most, we hope that will work.

Peptides – the science bit

Peptides have been made chemically for more than 50 years. You see them depicted in science books as a collection of lozenge shapes, colourfully threaded together.

A peptide is a shortened version of a protein, made up of a chain of amino acids. The human genome project of 2000 mapped 25,000 genes making up the human genome, and each gene produces a protein. Proteins in turn control every process essential for life.

To study proteins, scientists often find it easier to study small parts of them - ie, peptides.

Peptides also occur naturally in the body as hormones such as insulin and oxytocin, and peptide hormones regulate bodily processes, making them targets for drug development.

A peptide comprises 'building blocks' of amino acids. CRB buys these in to attach together in their chains. Staff take a synthetic polymer (resin) and attach the first amino acid. This resin is put into a tube within a peptide synthesis machine, and this adds the required amino acid, one at a time, until the desired peptide is fully assembled. The resin containing the peptide is then taken from the machine and treated with chemicals to chop the peptide off the resin – a process called 'cleavage'. The peptide is released as a white powder.

It's washed with ether to shed extraneous organics then dissolved in water. It's then purified by what's called reverse-phase, high-performance liquid chromatography.

As Humphrys explains: "At school you'd get a Smartie, lick it and put it on a bit of filter paper to see the colours separate. Our chromatography is much the same, but we are separating the peptide from its impurities on a basis of the 'oiliness' of the different molecules. It's all done on a very tiny scale in a narrow tube containing a special material with the same role as the filter paper in the Smartie experiment."

Peptides have been made chemically since the 1900s. In the late 1970s an invention improving the synthesis of peptides, the system CRB uses, was brought in.

CRB's peptides are used only for research, not on patients directly. Peptides can, though, be registered drugs, such as AstraZeneca's Zoladex drug to treat prostate cancer.

Peptides are versatile and can be made fairly cheaply within about two weeks. Sometimes they mimic certain properties of their derivative protein. "You can attach different things to peptides," Humphrys points out."So they're not only used to understand protein reactions, but also as an indicator to help test theories - like a light switch. Is it on or off? Have I a hit or not? In consequence, drug companies often use them to test their whole bank of compounds with a new target. We can also tag peptides with a radio isotope, a fluorescent dye or 'heavy' amino acid to help track or quantitate them in biological studies."

Dyes excite this company. As Humphrys explains: "Since 2001, we've been attaching proprietary fluorescent dyes to peptides. There are some clever things about dyes. You can attach one fluorescent dye to one end of a peptide and a different dye to the other end.

"One dye will soak up the emission from the other - quenching, we call it. When an enzyme cuts the peptide in half the two parts move further apart, preventing quenching. Light is given off and the fluorescence can be measured. So again, it's a great tool for measuring how something is working. In science we usually call those assays, a test to test what's happening; a colourful indicator of the biochemical process, and it's fantastic."

It's good news for medical patients too, because fluorescence chemistry is replacing radio isotopes in this aspect, offering an alternative to radioactivity.

CRB has been working with fluorescent dyes since 2001 through a deal with Amersham Biosciences. The firm then signed another deal with market leader Invitrogen-Molecular Probes in 2004 and increased its dye range to cover an entire spectrum from 300 nanometers to 750.

Now CRB deals with an Italian company, Cyanagen, which has more dyes. This firm, CRB says, is small, adaptable with keen prices and good products unimpeded by licence fees and royalties.