University of Southampton

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UNIVERSITY OF Southampton

University of Southampton: a UK partnering hub

With a distinguished history in the medical sciences and engineering, the University of Southampton continues to lead as a partner of choice in immunology and bioengineering.

Decades ago, University of Southampton researchers pioneered the use of antibodies in cancer treatment, and the world's first fiber-optic cables were drawn by its engineers. Combining these strengths, the university continues to be a leader in commercializing research emerging from its laboratories.

Located right in the middle of the biggest and greenest city on the British south coast, and only an hour away from Heathrow Airport, the University of Southampton has long been one of the prime academic centers in the United Kingdom.

Attracting research funding

According to the QS World University Rankings, the University of Southampton ranks among the top 100 universities worldwide. The University of Southampton is also one of the founding members of the Russell Group, an organization representing 24 prestigious research-intensive universities in the UK, and it ranks among the top 10% of UK universities in terms of research funding, with current levels in excess of $150 million.

The University of Southampton has long been a leader in research commercialization. The university has successfully created many medical and engineering spin-offs, including Karus Therapeutic and SPI Lasers, a wholly owned subsidiary of the Trumpf group. In 2003 the university also cofounded SETsquared, Europe's most successful university business incubator, which has helped more than 1,000 startups raise over $1.5 billion in investment.

Riding this wave of accomplishments, research groups in historically strong areas such as immunology and microfluidics are teaming up today to bring new breakthroughs in cancer treatment and diagnostics to the market.

Immunology

Immunology has been a key theme at the University of Southampton ever since the 1970s, when professors George and Freda Stevenson described for the first time how cancer-specific antibodies could be made for the treatment of lymphocytic leukemia. Today, immunology cuts across the university's full spectrum of medical research, and the cancer immunology research group remains on the cutting edge of research into the potential of the human immune system to fight cancer.

The university's track record in immunology stretches back all the way to the 1980s, and its potential in this field is still growing, attracting both leading scientists and companies to Southampton. Following in the footsteps of the Stevensons, Martin Glennie, professor and head of Cancer Sciences, and his colleagues were among the first to translate cancer immunology research into efforts to trigger immune responses to cancers of the prostate and colon and to leukemia; therapies resulting from some of those efforts, such as a next-generation, fully human antibody to B cell lymphoma, have now hit the market.

At the University of Southampton, high-end life sciences and engineering go hand in hand. Shown are crystals of a CD40-binding antibody developed at the university that boosts killer T cells and is being used to treat cancer patients.

"Immunotherapy has the potential to work in many ways," said Martin Glennie, who has led many of the university's efforts. "We believe, for example, that the human immune system recognizes most cancers as it might a virus infection and tries to infiltrate cancer cells with killer T cells. Often these T cells' killer function gets switched off, however, which enables the cancer to carry on growing."

Antibodies engineered to 'wake up' the T cells could restore their activity against a range of cancers. "We may soon be able to direct the body's natural defenses more effectively and hopefully trigger responses to a level where they can control cancer for the long term," Glennie said.

The University of Southampton is expanding its efforts in the area by creating the first dedicated Centre for Cancer Immunology in the UK, scheduled to open in 2017. The university still wants discoveries from its basic research to be translated into actual diagnostics and treatments. Therefore, it maintains a long standing and unique working partnership with the University Hospital Southampton NHS Foundation Trust that streamlines early- and late-stage clinical trials and gives access to well defined cohorts of patients in a population of more than 3 million people.

Microfluidics

Cross-disciplinary research is key to Southampton's success, as demonstrated by the Institute for Life Sciences, in which researchers from medicine, biology, chemistry, physics and engineering collaborate closely. Immunology is one area that benefits immensely from the combined expertise in these fields.

Supported by its 40-year history of first-class electronic and optical research, the university excels in, for example, microfluidics—the transport of tiny volumes of fluid that can be monitored and manipulated by micrometer-sized electronic circuits. Microfluidics can be used to quickly and precisely analyze molecules and single cells in research laboratories or in patient-care settings.

Southampton engineers first developed a way to use lasers to create patterns and channels in paper, creating inexpensive, controlled microfluidic flow chambers for assays that mimic lateral flow in more expensive chip designs. Such innovative methods can be very useful in high-throughput diagnostics or for performing diagnostics at sites where cost is critical.

Other work from the University of Southampton includes 'droplet microfluidics', in which the tiniest of droplets are contained and manipulated so that individual cells or cytokine molecules can be detected, sampled, separated or analyzed in real time. Other inventions from the university's labs help to selectively capture white blood cells from whole-blood samples, requiring less patient material than other methods do.

Business relations

Short-term and long-term industry collaborations or licensing deals around the rapidly evolving portfolio of opportunities are facilitated by an experienced industry relations team dedicated to biotechnology, health and pharma research thus ensuring that the University of Southampton can continue to fulfill its goal to change the world for the better. Contact Brigitte Lavoie regarding industry collaborations and James Hamilton regarding licensing (see below).

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