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# RCSI WORKING WITH INDUSTRY

RCSI DEVELOPING HEALTHCARE LEADERS WHO MAKE A DIFFERENCE WORLDWIDE



**RCSI**





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## Welcome from RCSI's Head of Innovation



Since its foundation in 1784, RCSI has played a leadership role in both research and in Irish surgical and medical education. The College's research vision is to improve human health through translational medical research, which is informed by bedside problems, societal and global health challenges. We will do this by promoting innovative research that ultimately leads to better diagnostics, therapeutics and devices.

The recently formed Office of Research and Innovation (ORI) aims to support this mission and, importantly, recognises that engaging with industry partners in the healthcare

arena can be a mutually beneficial step in this process. We aim to make the process of working with us as straightforward and rewarding as possible, adding value to industry R&D programmes, developing close partnerships with industry and encouraging repeat business. We plan to forge a reputation for flexibility, professionalism and expediency in engagements with industry and in the performance of commercially relevant research and look forward to engaging with your business.

As outlined in the coming pages that are many ways that industry can work with us: by helping to inform state funded research programmes or engaging in collaborative or contract research programmes. Through our experience and knowledge of the National and European research funding programmes, RCSI's ORI can expedite the identification of appropriate funding supports for industry-RCSI collaborations leading to efficient project set-up, implementation and knowledge transfer. In recognition of the importance of industry engagement, we have a dedicated Industry Liaison Manager, Dr Seamus Browne, who

will be the point of contact for all industrial partnerships and contract negotiations.

We welcome industry partners from all healthcare sectors, particularly those aligned with RCSI's interests in translational medical research who might benefit from our core strengths in regenerative medicine, bioengineering, cancer, respiratory diseases, neurodegenerative and psychiatric disorders, perinatal health, cardiovascular, inflammatory and infectious diseases. Please contact us to see how engaging with our researchers and clinical partners can add value to your business.

**Dr. Aoife Gallagher**

## RCSI in numbers

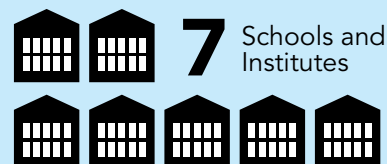


**3**

Founding partner in three  
**SFI Research Centres**



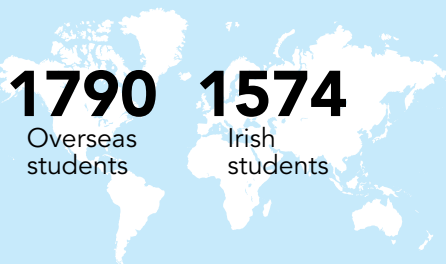
Sole provider of Surgical training in Ireland



Top

**1%**

RCSI's global ranking for citations in clinical medicine (Source: Essential Science Indicators)



**€50M**

Expansion of RCSI's research institute over the next five years



**7**

Hospitals in RCSI Hospital Group



More than  
**€100m**  
value of research grants signed in last six years



**450**



people in core research community

To find out more visit [www.rcsi.ie](http://www.rcsi.ie)

## RCSI Research – improving healthcare

The mission of RCSI's research institute is to improve human health through translational research: clinical, laboratory based and health service research informed by bedside problems, and societal and global health challenges.

### We apply our core expertise in:

- › Advanced biomaterials and drug delivery
- › Neuroscience
- › Pharmaceutical sciences
- › Systems Biology
- › Molecular medicine
- › Population health/Health services
- › Medical, surgical and healthcare education

### In the areas of:

- › Orthopaedics
- › Perinatal health
- › Cancer
- › Cardiovascular disease
- › Respiratory disease
- › Neurodegenerative and psychiatric disorders
- › Regenerative medicine
- › Inflammatory and infectious diseases

### To enable improved:

- › Diagnostics
- › Therapeutics
- › Devices
- › Healthcare delivery
- › Clinical practice
- › Healthcare professional education.

## RCSI's core expertise



Advanced biomaterials and drug delivery



Neuroscience



Pharmaceutical sciences



Systems Biology



Molecular medicine



Population health/ Health services



Medical, surgical and healthcare education

## Applied in the areas of

Orthopaedics

Perinatal health

Cancer

Cardiovascular disease

Respiratory disease

Inflammatory and infectious diseases

Neurodegenerative and psychiatric disorders

Regenerative medicine

## To enable improved



Diagnostics



Therapeutics



Devices



Healthcare delivery



Clinical practice



Healthcare professional education



## Industry engagement at RCSI

At RCSI, we believe meaningful engagement, collaboration and partnership with industry is an essential component to achieving our research mission. We are deeply interested in working with industry, both multinational corporations (MNCs) and small and medium-sized

enterprises (SMEs) in the areas of regenerative medicine, orthopaedics, perinatal health, cancer, cardiovascular disease, respiratory diseases, neurodegenerative and psychiatric disorders, inflammatory and infectious diseases through the following mechanisms:

### Industry informed

- › Research informed by industry but directed by academia
- › No company funding required
- › No company pre-emptive rights to project results

### Industry collaborative

- › Research directed collaboratively by industry and academia
- › Company typically pays a proportion of project costs
- › Option to licence project results

### Industry directed

- › Research directed by company
- › Company pays full cost of project
- › Possible for company to own project results

As a higher education institute with an exclusive focus on human health, RCSI can offer unique opportunities for industry that include:

- › Access to well-defined translational research programmes, clinical expertise, network of clinicians and state of the art biomedical and clinical research infrastructures.
- › A professional industry relationship management team to ensure ease of, benefit from, and co-ordination of engagement with RCSI researchers.

- › Access to RCSI's expertise and knowledge to help apply for appropriate National and European funding support to co-fund your project.
- › An efficient, agile approach to negotiation of contracts with industry due to our size and independent status.
- › Access to an array of therapeutics, diagnostics and medical device technologies available for commercial exploitation.



## Funding your company's research project

RCSI's ORI has experienced staff that will help companies navigate the complicated National and International funding landscape to identify the most appropriate funding programme

for their particular research need. Examples of such funding programmes are provided below:

Funding Mechanism	Objective
100% Industry Funding	Allows your company to work with RCSI to address a specific research question where expeditious project set-up is critical. Project value and duration at your company's discretion.
EI Innovation Partnership Programme Funding	Enables your company, provided it is located in Ireland, to utilise RCSI's capabilities in a mutually-beneficial collaborative effort to improve your company's products, processes or services.
SFI Research Centre Targeted Funding, Rolling Spoke Funding and Fixed Spoke Funding	Provides a mechanism for your company to engage in new collaborative research projects between your company, RCSI researchers and existing SFI research centres.
SFI Industry Fellowship Placement Funding	Facilitates (a) your company embedding RCSI researchers in your company; or (b) your company embedding company personnel in RCSI.
Horizon 2020 Funding	H2020 funding schemes are based on competitive calls and are open to research institutes and companies. A wide range of research and innovation topics are covered. RCSI can provide guidance to your company on the mechanisms and options available, as well as support for the application process.
IRC Employment-based Postgraduate Award	Provides support for an employee in your company to pursue a Masters/PhD degree at RCSI.
IRC Postgraduate and Postdoctoral Enterprise Partnership Award	Develops partnerships between your company and RCSI research groups through co-supervised MSc, PhD and Postdoctoral projects.

Our industry engagement process



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## Case studies

RCSI has partnered with a wide range of companies to address a number of healthcare challenges to enable improved diagnostics, therapeutics, devices, enhanced healthcare delivery, clinical practice and healthcare professional education. Models of engagement vary and are tailored to meet the company requirements as illustrated in the following case studies.



## Anti-inflammatory drug delivery

### Engagement type

Industry Fully Funded Research Project

### Industry partner

Horizon Pharma plc is a specialty biopharmaceutical company focused on improving patients' lives by identifying, developing, acquiring and commercializing differentiated products that address unmet medical needs. The company markets a portfolio of products in arthritis, inflammation and orphan diseases.

### Challenge

While the potential of protein-based therapies in treating disease is widely recognised, the clinical and commercial translation of biotherapeutics can be limited by suboptimal pharmacokinetics, biochemical instability, adverse effects and inefficient delivery. This engagement focused on testing novel delivery technologies for a protein-based therapeutic with a particular focus on formulation, pharmaceutical characterisation and pharmacokinetics.

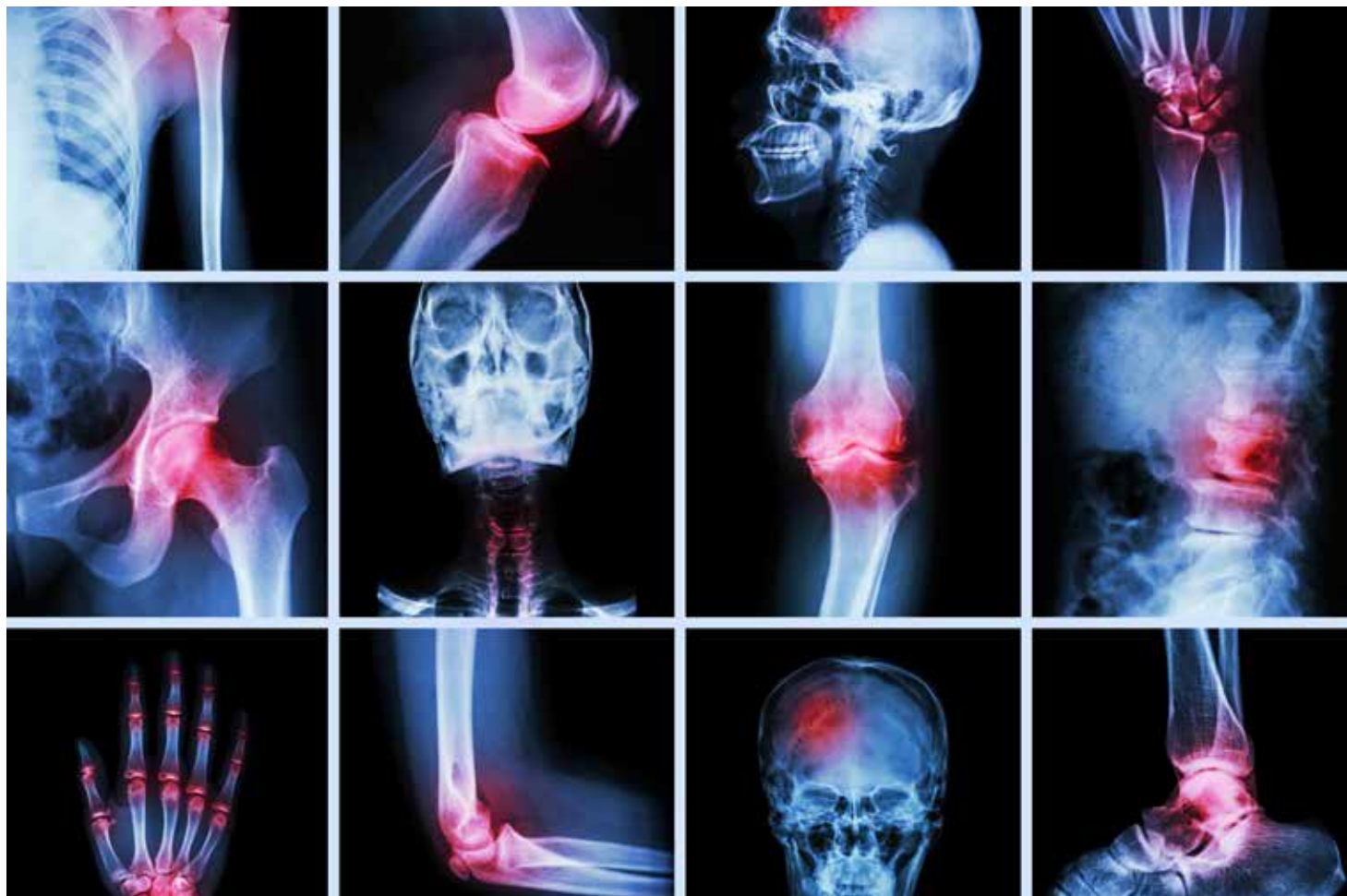
### RCSI value-add

A dynamic multidisciplinary research team in RCSI's School of Pharmacy with access to state-of-the art facilities and a proven track record of working in and with the BioPharma industry. RCSI performed protein characterisation studies, in vitro and preclinical in vivo pharmacokinetics and provided advice on pharmaceutical formulation.



*"Our research project with RCSI has significantly advanced our understanding of the challenges in therapeutic protein drug delivery and has provided a sound basis for further R&D which we hope will lead to a commercial application."*

Dr John Devane,  
Group Vice President and General Manager,  
Horizon Pharma



## Biomaterials for bone and cartilage repair

### Engagement type

Enterprise Ireland Innovation Partnership  
Funded Research Project

### Industry partner

SurgaColl™ Technologies, an RCSI Spin-out company, is commercialising a range of biocompatible, bioactive, and naturally-derived scaffolds to enable faster, higher quality bone and cartilage regeneration.

### Challenge

Bone grafts are second only to blood transfusions on the list of transplanted materials worldwide. Autogenous bone, currently the clinical “gold-standard” is not always ideal due to availability of donor tissue and donor site morbidity. Cartilage damage resulting from osteoarthritis affects more than 10% of the US population over 25 years of age, making it the most common form of degenerative joint disease. Regeneration of hyaline cartilage is one of the most elusive challenges facing researchers in the orthopaedic industry today. This project focused on robust preclinical evaluation of two pipeline SurgaColl materials to address these significant clinical needs.

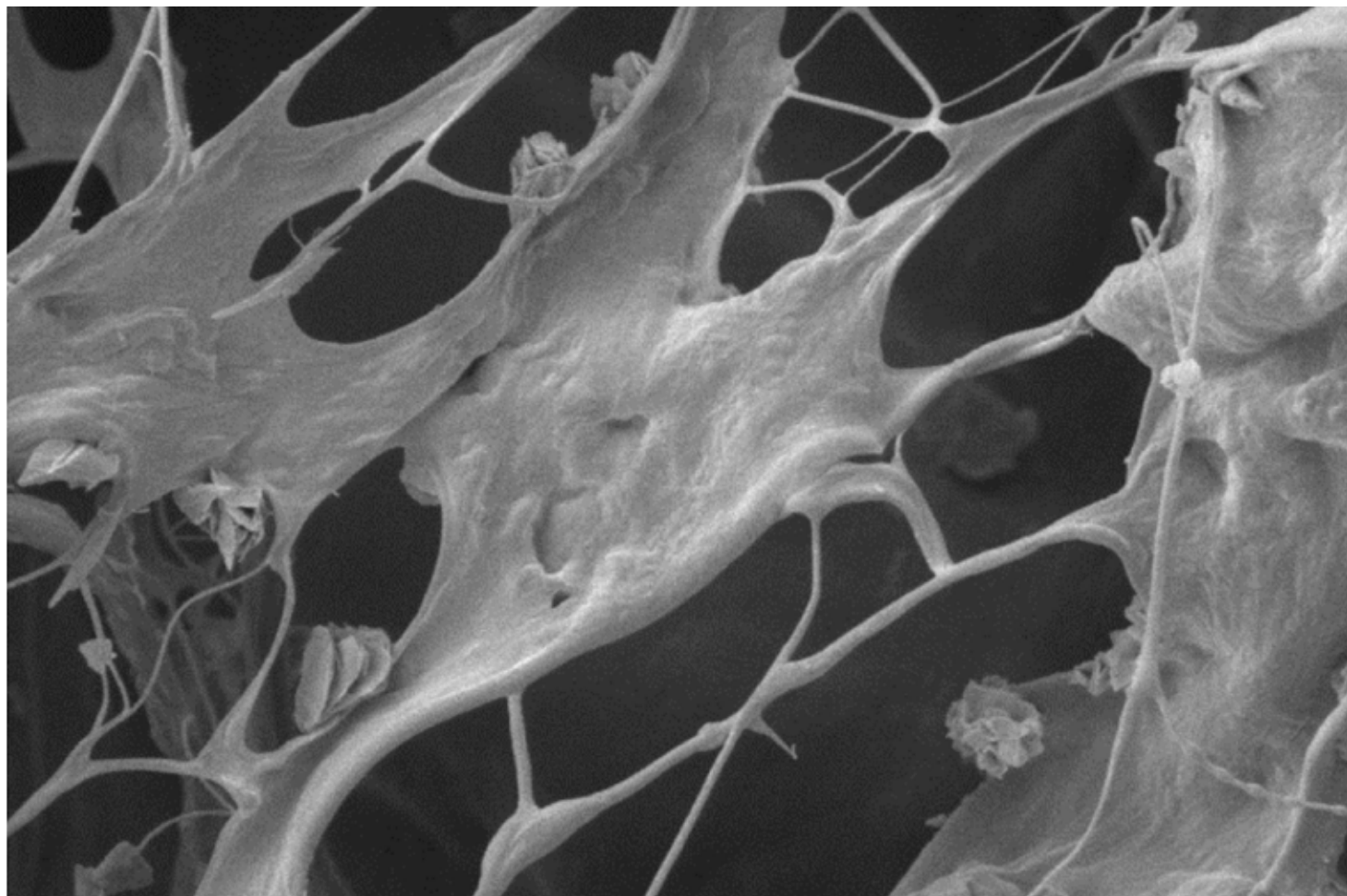
### RCSI value-add

World class biomaterials research expertise (based in RCSI's Tissue Engineering Research Group in the Dept. of Anatomy) in restoring the structural and functional properties of damaged or degenerated tissue and mature collaborative relationships with leading Irish and International research centres.



*“The experimental work carried out during this project accelerated our efforts to bring these materials to the market and provide the potential to have a direct impact on the quality of life of patients suffering from degenerative bone and joint diseases.”*

Pat Forristal,  
Chairman, SurgaColl





## Personalised treatments for cancer patients

### Engagement type

EU Funded Research Project

### Industry partner

OncoMark is an Irish SME focused on the development and application of biomarker panels, particularly those supporting oncology clinical decisions and drug development.

### Challenge

The number of Irish people suffering from colorectal cancer is predicted to increase by 34% in women and 45% in men by 2020. In addition to surgical resection, common adjuvant or neo-adjuvant treatments include radiotherapy and chemotherapy. Yet, cancer cells often are, or become resistant to these treatments. Led by RCSI, the APO-DECIDE research consortium ([www.apodecide.eu](http://www.apodecide.eu)) is tackling the problem of chemotherapy resistance in colorectal cancer by analyzing protein levels and DNA mutations in individual tumours, and by incorporating this biological data into mathematical models that recapitulate how these entities interact.

### RCSI value-add

Expertise in the development of computational approaches to understand and overcome apoptosis sensitivity and resistance at a systems level along with dedicated support for the co-ordination of EU projects.



*"The new prediction tools developed in this engagement will enable doctors to develop personalized treatments for their patients to ensure the best patient outcomes, while potentially avoiding unnecessary chemotherapy treatment and associated side effects."*

Dr Máirín Rafferty,  
CEO, OncoMark Ltd



## Drug delivery using medical devices

### Engagement type

SFI Research Centre Co-Funded Targeted Research Project

### Industry partner

Aerogen is an innovative medical device and drug delivery company specialising in the design, manufacture and marketing of aerosol drug delivery systems, aimed at the critical care respiratory market.

### Challenge

Although there are a growing number of small molecule and biomolecule therapeutics under development for respiratory pathologies, translation of these therapies has been hindered by inefficient drug delivery and drug instability. Aerogen's vibrating mesh nebulisers can deliver large biomolecules to the lungs effectively and the focus of this project is to investigate the delivery of a range of therapeutics in combination with Aerogen's nebulisers.

### RCSI value-add

RCSI provided expertise in respiratory medicine, API characterisation, pharmaceutical formulation, pharmacokinetics and controlled release drug delivery systems.



*"Aerogen is an award winning company that continues to invest heavily in R&D and product design. Strategic alliances with leading research institutes such as RCSI have enabled Aerogen to leverage home-grown scientific excellence to facilitate its rapid growth."*

Dr Colin Telfer,  
Director of Business Development, Aerogen



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## Better diagnosis of motor neuron disease

### Engagement type

Technology Licence

### Industry partner

Athena Diagnostics, a division of Quest Diagnostics, offers specialty diagnostic testing services for rare neurological disorders through its network of laboratories and patient service centers, and provides interpretive consultation through its extensive medical and scientific staff.

### Challenge

Amyotrophic lateral sclerosis (ALS) is one of a group of disorders known as motor neuron diseases. It is characterized by the progressive degeneration and eventual death of nerve cells (motor neurons) in the brain, brainstem and spinal cord that facilitate communication between the nervous system and voluntary muscles of the body. ALS is difficult to diagnose early because it may appear similar to several other neurological diseases.

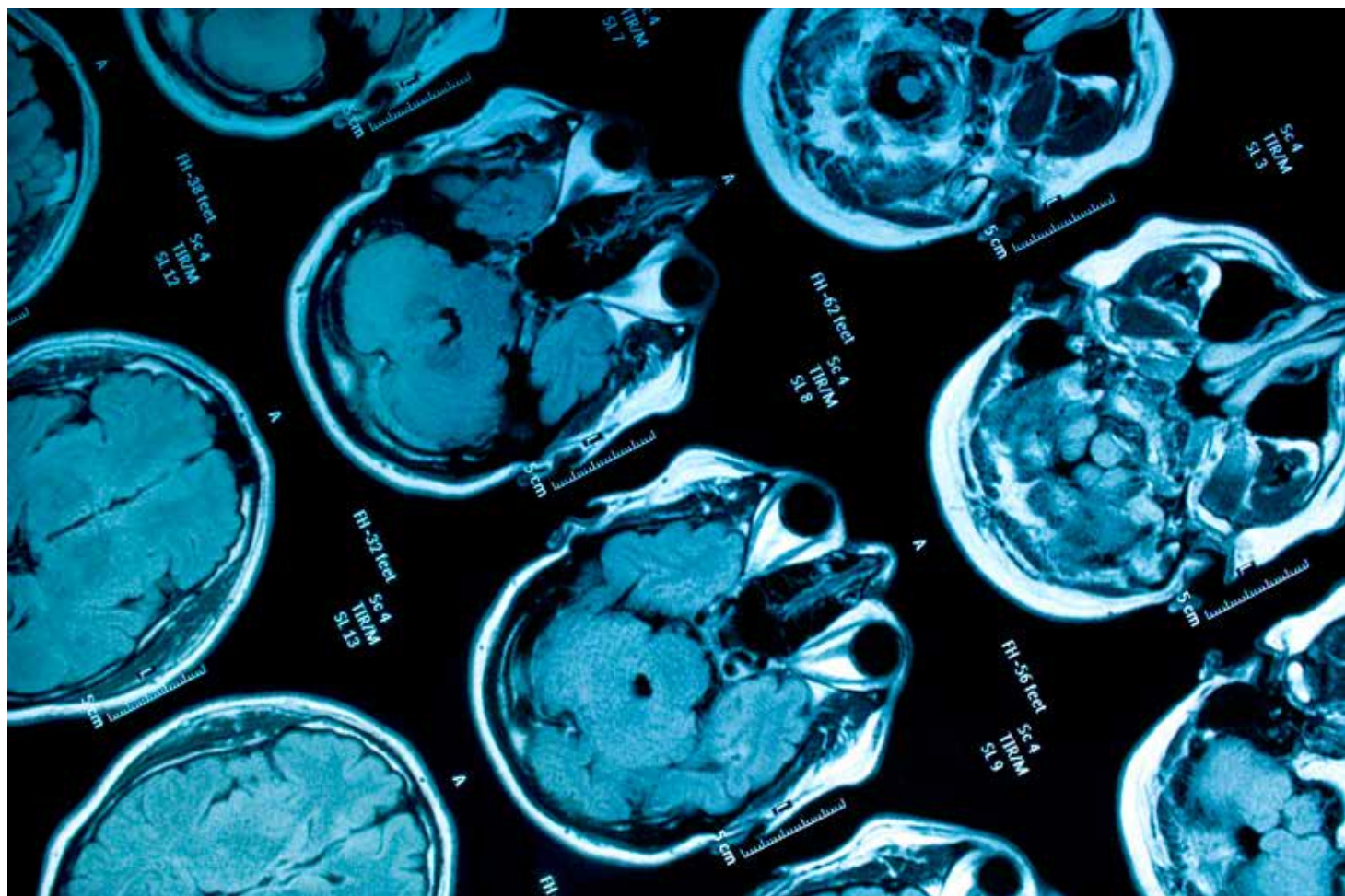
### RCSI value-add

Researchers at the Departments of Neurology and Physiology and Medical Physics in RCSI identified and characterised mutations in a gene encoding for Angiogenin (ANG) in ALS patients. Angiogenin is a member of the ribonuclease (RNase) A superfamily and has been described as a hypoxia inducible factor. Previous research in endothelial cells has identified Angiogenin as a potent inducer of neovascularisation, but a role for Angiogenin in neurodegeneration prior to the work of the RCSI research group had not been described. Through their analysis of the angiogenin gene, the RCSI Research Group was able to develop a method of assessing whether an individual is afflicted with, or genetically predisposed to developing, ALS.



*“Quest Diagnostics and Athena Diagnostics are the world’s leading providers of diagnostic information services that patients and doctors need to make better healthcare decisions. The ALS assay developed in RCSI aligns well with our company’s vision, namely, Empowering Better Health with Diagnostic Insights.”*

Karthik Kuppusamy, Ph.D.,  
General Manager, Neurology Solutions, Athena



## IP commercialisation

RCSI has a portfolio of patented technologies relevant to the medical device, therapeutic and diagnostic sectors amongst others. RCSI's Office for Research and Innovation is responsible for the exploitation of existing RCSI Intellectual Property (IP) via

licencing to both established and start-up companies. We are very interested in working with established companies and entrepreneurs to commercialise these technologies.



Diagnostics



Therapeutics



Devices



Healthcare  
delivery



Clinical  
practice

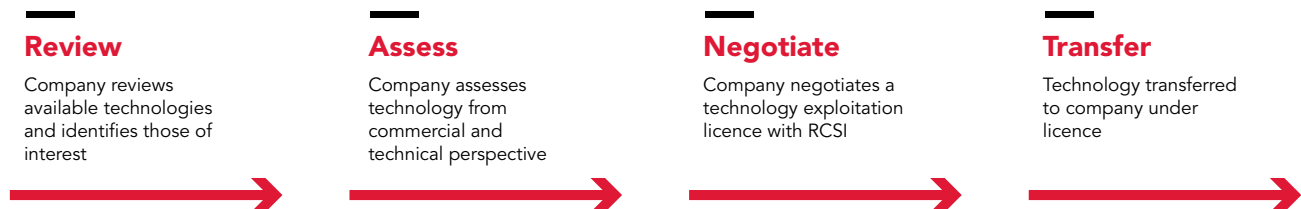


Healthcare  
professional  
education



## IP commercialisation process

At RCSI, we understand that extracting IP from higher education institutions has traditionally been seen as a difficult and frustrating experience. Therefore, we have established an experienced, pro-business team in RCSI's Office of Research and Innovation to support the licensing of RCSI IP to both established and start-up companies.



Typically, academic researchers prefer to support rather than lead the start-up process. Accordingly, we strongly welcome interest from appropriately experienced and motivated entrepreneurs who wish to use their skills and expertise to create High Potential Start-up (HPSU) companies to commercialise RCSI IP.

Ireland has many generous government supports for both start-up and established companies performing R&D in Ireland. RCSI's Office of Research and Innovation has valuable expertise in accessing this funding to assist in the absorption of the RCSI technology by the licencing company.

## RCSI Clinical Research Centre

The RCSI Clinical Research Centre provides state of the art facilities and expertise to enable investigators to conduct clinical research to the highest standards. The Centre is located on the Beaumont Hospital campus, one of RCSI's principal teaching hospitals in Dublin. Since opening in September 2000, the centre has had more than 19,700 patient visits. During this time, the activities of the Centre have developed a cohort of highly skilled and trained research nurses with the attendant expertise to enable clinical research.

### **RCSI Clinical Research Centre facilities include:**

- › Pharmacy - Storage of temperature monitored clinical trial medications under secure conditions
- › Platelet lab - Analysing blood samples for platelet activity under different conditions i.e. patients on certain medications
- › Vascular imaging suite - Carotid ultrasound imaging, echocardiography and retinal photography – facilitates analysis of blood flows and eye scans
- › Consultation rooms - Patient consultations and study visits
- › Samples room - Processing of blood and biological samples; storage of biological samples (refrigerator, -20° and -80° freezers).
- › Clinical suite - Patient consultations and study visits
- › Day ward - Patient day visits, overnight patient studies (with oxygen, suction and resuscitation trolley facilities)
- › Phlebotomy room - For taking patient blood samples



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## Contact Us



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# Location

The main RCSI campus is located close to St Stephen's Green in the very heart of Dublin city.



Research featured in the case studies funded by:



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