Research Fellow in Structural/Chemical Biology

INSTITUTE OF MEDICAL SCIENCES,
SCHOOL OF MEDICINE, MEDICAL SCIENCES & NUTRITION

Closing date: 31 August 2023
Interview date: To Be Confirmed
Reference number: IMS273R
INTRODUCTION

This post is based in the Institute of Medical Sciences at the University of Aberdeen. The successful applicant will join a group led by Dr Wael Houssen focused on developing enzymatic tools to generate bioactive cell-permeable peptides.

Our group is interested in identifying enzymes that could modify cyclic peptides in such a way that could improve their pharmacokinetic properties. Cyanobactin prenyltransferases are a group of cyanobacterial enzymes that can incorporate lipophilic isoprene moieties with high residue- and regiospecificity in linear and cyclic peptides. Consequently, they increase the lipophilicity of the peptides and thus enhance their cellular permeability. We biochemically characterised several prenyltransferases and studied their tolerance to accept unnatural isoprene donors. Some of these unnatural moieties display reactive groups that are amenable to additional functionalization via click chemistry. (see our publication Angew. Chem. Int. Ed. 2023, e202215979; doi.org/10.1002/anie.202215979). This chemoenzymatic approach is useful for many applications e.g. fluorescent labelling of peptides, imaging or conjugation with antibodies. You will be part of a large team and you will use protein crystallography to identify the structure of some of these prenyltransferases and use the structures to guide the design of novel functionalised isoprenoids for specific applications. You will also use structural and biochemical insights to engineer enzyme variants that has better kinetics and wider promiscuity for these cofactors.

JOB DESCRIPTION

MAIN PURPOSE OF THE ROLE:

This project builds upon our recent work in which we recruited prenyltransferases to incorporate clickable functional groups in cyclic and linear peptides and following this with further modifications using click chemistry. We need to use structural data to design functionalised isoprenoids that are suitable for each enzyme and hold great potential for downstream applications. Specific objectives are:

1- Use protein crystallography and biochemical assays with unnatural cofactors to determine the structure and mechanism of action of prenyltransferases.

2- Use structural and biochemical insights to engineer enzyme variants that have better kinetics and wider substrate promiscuity.

3- Monitor the effect of incorporation of isoprene cofactors on cellular permeability of peptides.
KEY RESPONSIBILITIES:

- Responsible for detailed planning and execution of research experiments.
- Generate and analyse data in preparation for reports and publications.
- Take a leading role in the drafting of manuscripts and in the presentation of results at national and international meetings, symposia and conferences.
- Keep up-to-date with the current and relevant literature and methodologies in order to gain an expert working knowledge of the topic under study.
- Participate in meetings and help drive existing, and identify future, external collaborations.
- Maintain contact with the industrial partner and other academic collaborators.
- Help with maintaining risk assessments and overall organisation of the laboratory.
- Act as mentor, direct supervisor and advisor for other scientists and students in Dr Houssen’s group.

CANDIDATE BACKGROUND

You must have a PhD in structural biology, chemical biology, synthetic biology, biochemistry or related subjects and specific expertise in X-ray protein crystallography. You should also demonstrate a track record of high-quality research publications. Experience in solid phase peptide synthesis will be an advantage but training is available if needed.
**TERMS OF APPOINTMENT**

Salary will be at the appropriate point on the Grade 6, £37,099 - £40,521 per annum and negotiable with placement according to qualifications and experience.

Any appointment will be made subject to satisfactory references and probation period.

For further information on various staff benefits and policies please visit www.abdn.ac.uk/staffnet/working-here

This role is based in the UK and as such the successful candidate will be required to live and work in the UK.

This post does not meet the minimum requirements for visa sponsorship under the Skilled Worker Route. We are therefore unable to consider applicants for this post that require sponsorship to work in the UK.

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**AT A GLANCE**

**SALARY:**
Grade 6
£37,099 - £40,521 per annum

**HOURS OF WORK:**
Full-time, 37.5 hours per week

**CONTRACT TYPE:**
Funding-limited for 9 months (cannot exceed 31 July 2024).

**LOCATION:**
Aberdeen
# Person Specification

## Education/Qualifications

**Academic, technical and professional education and training**

- **PhD in structural biology, chemical biology, synthetic biology, biochemistry or related subjects**

## Work and Other relevant experience (including training)

**e.g. Specialist knowledge, levels of experience, supervisory experience, research**

- Experience in heterologous expression of proteins mainly in E. coli.
- Experience in protein purification, and Western blot analysis.
- Experience in setting up crystallisation trials and in using X-ray protein crystallography to determine the structure of proteins.
- Experience of heterologous expression of proteins in other hosts e.g. yeast.
- Experience in using mass spectrometry and NMR to confirm and elucidate peptide structures.
- Experience in solid phase peptide synthesis.

## Personal qualities and abilities

**e.g. initiative, leadership, ability to work on own or with others, communication skills**

- Ability to work independently and use initiative to progress the project effectively.
- Excellent communication and IT skills.
- Evidence of having prepared manuscripts for publication and having presented work to significant audiences at scientific meetings.
- Ability to work well with others in the team and provide training to other staff members where needed.

## Other

**e.g. special circumstances (if any) appropriate to the role such as unsocial hours, travelling, Gaelic language requirements etc.**

- Willingness to work flexibly and outside regular hours should experiments require.
- Willingness to travel to our collaborators lab for training and carrying out essential experimental work and to travel...
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The University of Aberdeen is a broad based, research intensive University, and we put students at the centre of everything we do. Outstanding in a wide range of discipline areas, Aberdeen is credited for its international reach and commercialisation of research ideas into spin out companies. The University has over 16,000 matriculated students and 3,600 staff representing 130 nationalities. We encourage bold thinking, creativity and innovation, and we nurture ambition with many opportunities for professional and personal development in an inclusive learning environment which challenges and inspires.

**CURRENT CONTEXT**

The University continues to uphold the principals of the foundational purpose. We remain committed to delivering positive change both locally and globally. We work together and with our partners in an interdisciplinary way, catalysing world-leading research in our areas of strength: Energy Transition; Social Inclusion and Cultural Diversity; Environment and Biodiversity; Data and Artificial Intelligence; and Health, Nutrition and Wellbeing. We are investing in our future and have committed £100m to upgrading our campus, including the new fully digitised Science Teaching Hub, the regeneration of the historic King’s Quarter and a new Business School building. Our commitment to our students, campus and community has led to us being named a Top 20 UK institution in two major league tables¹ and 4th in the UK for overall student satisfaction².

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¹ The Times and Sunday Times Good University Guide 2023 and the Guardian University Guide 2023
² National Student Survey (NSS) 2022

Updated October 2022
ABERDEEN 2040
On our 525th anniversary as a University we launched Aberdeen 2040, our strategic vision for the next 20 years. Four strategic themes will shape our learning and discovery, underlined by 20 commitments we have made against each theme:

- **Inclusive**
  We welcome students, staff and partners from all backgrounds, organisations and communities. We value diversity.

- **Interdisciplinary**
  We innovate in education and research by generating, sharing and applying new kinds of knowledge. We learn together.

- **International**
  We connect with others and extend our networks and partnerships around the world. We think across borders.

- **Sustainable**
  We understand and nurture our environment, and take care of our resources, including our people and finances.
  We work responsibly.

OUR EDUCATION
Recognised as the Scottish University of the Year in the Times and Sunday Times Good University Guide 2019, we remain true to our roots as an ancient Scottish university, combining breadth and depth in our degree programmes and drawing strength from the quality of our research. Our flexible curriculum encourages students to grow as independent learners and therefore to thrive as graduates in the diverse workplaces of the future. Our education is open to all and we are setting ambitious targets to further widen access.

OUR RESEARCH
Researchers at the University of Aberdeen have been at the forefront of innovation and excellence throughout the centuries, generating insights in medicine, science, engineering, law, social sciences, arts and humanities. This research has contributed to five Nobel prizes as well as other awards such as the Queen’s Anniversary prize. Our research is intellectually rigorous working within our established areas of excellence as well as new methods of enquiry. We will continue to generate new knowledge addressing economic and societal issues with ambition and imagination, ensuring that it is globally excellent and locally relevant.

INTERNATIONAL
Aberdeen is increasing its international presence, positioning the University as a global organisation and building on established global partnerships around the world, including Qatar, China, North America, Europe. We feature in the top 50 institutions worldwide for international students\(^1\).

\(^1\) Times Higher Education World University Rankings 2021
IMPACT

In 2020 the University signed the United Nations Sustainable Development Goals accord, solidifying our commitment to developing the world in a sustainable way. In 2022 we were listed in the global Top 100 for 8 of these goals⁴.

Our highly cited work in zero-carbon technology and global outlooks makes us Scotland’s best institution for environmental research⁵.

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⁴ Times Higher Education Impact Rankings 2022
⁵ QS World University Rankings 2022
The School of Medicine, Medical Sciences and Nutrition

The School (https://www.abdn.ac.uk/smmsn/index.php) encompasses all of the disciplines that underpin today’s medicine, including biomedical sciences, health sciences, nutrition and medical, medical science and dental education and these are organised into five Institutes. The largest school in the University, the SMMSN has five Institutes: the Institute of Medical Sciences (IMS), the Institute of Applied Health Sciences (IAHS), the Rowett Institute, the Institute of Education in Healthcare and Medical Sciences (IEHMS) and the Institute of Dentistry, comprising all of our undergraduate and postgraduate programmes and our own graduate entry Dental School.

Staff are line managed and research opportunities are supported through our institutes which work together in an integrated and coordinated way to deliver research and teaching across the School, details of which can be found on their websites as below.

- The Institute of Applied Health Sciences https://www.abdn.ac.uk/iahs/
- The Institute of Medical Sciences http://www.abdn.ac.uk/ims/
- The Rowett Institute http://www.abdn.ac.uk/rowett/
- The Institute of Education in Healthcare and Medical Sciences https://www.abdn.ac.uk/IEHMS/
- The Institute of Dentistry https://www.abdn.ac.uk/dental/ https://www.abdn.ac.uk/dental/

Within the IMS, our scientists are working towards the creation of effective therapies for patients with a range of debilitating and life-threatening conditions. Current research areas include: arthritis and musculoskeletal medicine; cell developmental and cancer biology; immunity, infection and inflammation; metabolic and cardiovascular health; microbiology and translational neuroscience.

Within the IAHS, research is focused on improving health and health care delivery. It is home to a multidisciplinary grouping of around 100 university academic staff who conduct population and clinically-orientated health research and hosts the Health Services Research Unit (HSRU) and Health Economics Research Unit (HERU), both funded by the Chief Scientist’s Office (CSO) of the Scottish Government.

As well as being the organisational home to the teaching scholarship staff and responsible for oversight of the UG and PGT programmes offered by the School, the IEHMS promotes and supports excellence in medical education through research and development, with a focus on conceptually and theoretically robust research and development which has strong potential for reaching international recognition. The highly regarded University of Aberdeen MBChB programme and several postgraduate programmes including a Masters in Clinical Education are delivered by IEHMS.

The Dental Institute runs an undergraduate BDS programme and a growing suite of masters programmes for professional development.

We have a number of specialist Centres representing areas of particular research strength and capacity within the School all of which are willing to support colleagues on projects in their areas. More information is available at the following websites.

Updated October 2022
The Centre for Healthcare Education Research and Innovation (https://www.abdn.ac.uk/cheri/)
The Centre for Health Data Science (https://www.abdn.ac.uk/achds/)
The Aberdeen Cardiovascular & Diabetes Centre (https://www.abdn.ac.uk/acdc/) and
The Aberdeen Centre for Arthritis and Musculoskeletal Health (https://www.abdn.ac.uk/acamh/)

The School is home to over 800 staff and 2000fte students. It is located on the Foresterhill site, shared with our main clinical partner, NHS Grampian, with whom we work in close collaboration at primary and secondary care levels.

This is one of the largest integrated healthcare delivery, training and research sites in Europe and has rich assets including state-of-the-art academic (research and teaching) and clinical buildings. Excellent infrastructure is also provided through core facilities for biomedical science including flow cytometry, proteomics, microscopy and genome sequencing, support for data health science projects and clinical trials.

The last major academic capital development was the opening of the Rowett Institute, occupied in March 2016, whose staff undertakes nutrition research to help improve people’s lives through the prevention of ill-health and disease. Their new £40M building has provided the University of Aberdeen with a facility with unique capabilities for human nutrition and metabolic research.
Aberdeen and Aberdeenshire

Scotland’s third largest city, Aberdeen sits on the coast between the mountains of Aberdeenshire and the stunning North Sea coastline. The Aberdeen City region is a can-do place that is actively investing, at scale, in its future.

Renowned as a Global Energy Hub, Aberdeen is a vibrant, entrepreneurial region, home to a unique mix of business opportunities and specialist skills across various sectors including energy, technology, life sciences and food & drink. More than 20% of Scotland’s top businesses are located in this region which is taking great strides to ensure that it continues to compete on a world stage. Investments of more than £10 billion of public and private infrastructure is due to be delivered before 2030, marking an exciting time to be part of a genuine world-class location.

Built from sparkling local granite Aberdeen has earned the name of the Silver City. As the energy capital of Europe, Aberdeen nevertheless retains its old-fashioned charm and character making it an attractive place in which to live, work and study. Due to its global business and international energy industry credentials, Aberdeen is well served by local and national transport infrastructure with excellent rail networks that run both North and South of Scotland and the rest of the UK. It also acts as an international travel hub. Flying time to London is just over one hour with regular daily flights and serves international travel to European centres such as Amsterdam (Schiphol) and Paris (Charles de Gaulle) as well as flights to other European destinations.

The City and the surrounding countryside provide a variety of urban, seaside and country attractions. Aberdeen has first class amenities including His Majesty’s Theatre, Music Hall, Art Gallery, the P&J Arena, Museums, and Beach Leisure Centre. The City is framed by its accessible beach front which is within a short walk of the city centre and there are an array of activities available across the region such as hill walking; mountaineering; sailing; surfing; salmon, trout and sea fishing; golf; sailing; surfing and windsurfing. The surrounding countryside, known as Aberdeenshire, is also one of Scotland’s most appealing regions. Royal Deeside and the Cairngorms National Park are within easy access of the city, and there are a variety of towns and villages scattered along the coastline.

The city and the surrounding area have ranked consistently highly in nationally recognised quality of life surveys, coming out top 10 as one of the best places to live in Scotland in 2020 in the annual Bank of Scotland survey.

To find out more visit www.visitabdn.com
EQUALITY AND DIVERSITY

The University values a diverse working environment and recognises the benefits this can bring. The University is keen to receive applications from individuals from across all of the equality protected characteristics (age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation).

The University supports opportunities for flexible working for a range of reasons and has policies in place to facilitate this. The policies can be found at https://www.abdn.ac.uk/staffnet/working-here/flexible-working--5607.php.

The University’s commitment to gender equality has been recognised through the achievement of an Athena SWAN Bronze award at an institutional level and across all its subject areas. The University is also a Stonewall Diversity Champion to further LGBT+ equality.

The University is signed up to Advance HE’s Race Equality Charter, affirming the University’s commitment to the charter’s aim of improving the representation, progression and success of minority ethnic staff and students within higher education.

Candidates who are British Sign Language (BSL) users can contact us directly by using contact SCOTLAND-BSL.

The University is delighted to be accredited as a Disability Confident employer and strives to ensure that disabled staff and students have the opportunity to work and study in an inclusive, accessible and supportive environment.

www.abdn.ac.uk/staffnet/governance/equality-and-diversity-277

HOW TO APPLY

Online application forms are available at www.abdn.ac.uk/jobs

The closing date for receipt of applications is 31 August 2023

Should you wish to make an informal enquiry please contact:

Dr Wael Houssen, Reader
01224 437564
w.houssen@abdn.ac.uk

Please do not send application forms or CVs to Dr Houssen.

Please quote reference number IMS273R on all correspondence

Updated October 2022