The Royal College of Radiologists

The Royal College of Radiologists
RCR-Cyclotron Trust Visiting Fellowships 2022/23 (Clinical Oncology)

**POST-VISIT REPORT**

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| **1. Name of Visiting Fellow** | **Maria A. Hawkins** | |
| **2. Name of joint Visiting Fellow (if applicable)** | **Andy Nisbet** | |
| **3. Institution(s) of Visiting Fellow(s)** | **University College London** | |
| **4. Name of Host(s)** | **Hanna Koivunoro, PhD, Chief Medical Physicist** | |
| **5. Institution(s) of host(s)** | **Helsinki University Hospital, Comprehensive Cancer Center** | |
| **6. Expenses claimed** | **£** | |
| **7. Visit Dates (ACTUAL)** | **a. Start Date 3 July 2024** | **b. End Date 4 July 2024** |
| **8. 2nd visit dates** ***(if applicable)*** | **a. Start date** | **b. End Date** |
| **9. Aims of the visit** | | |

The aim of the visit was to understand the following:

Organization, operation and management of a clinical Boron Neutron Capture Therapy (BNCT) treatment facility.

Physical dosimetry of BNCT; Prescribing and treatment planning for BNCT; Dose reporting in BNCT in a clinical environment, Boron concentration determination and imaging; Clinical trial planning and design and other procedures for BNCT.

Discuss research aspects relating to physical dosimetry of BNCT, prescribing and treatment planning for BNCT; dose reporting in BNCT in a clinical environment, Boron concentration determination and imaging. Emerging Boron compounds and development of new compounds; Radiobiology of BNCT. Developing research collaborations.

**10. Activities undertaken**

We were given a tour of the department, the accelerator room, the treatment rooms and clinical area and shown the various components of the facility including on-rail CT and robotic couch.

We have discussed a variety of set ups, immobilisation options and treatment considerations for the horizontal beam.

We have “walked“ a patient treatment pathway and the mix of physicists, radiographers, clinicians and biomedical engineers were present at these.

We have observed a QA session .

We have discussed step by step use of the planning for BNCT using Raystation and walkthrough of dose calculation components and combination of the blood measurements in the planning system, organ at risk calculation and the physical components of the dose.

Meeting with the wider team of lead clinicians and senior physicists and discussion of the history of BNCT in Finland and how previous treatments, performed in a research facility, and outcomes can inform current practice and research.

Discussion regarding Planned Phase I trial tumour selection, patient selection and endpoints and research opportunities.

**11. Benefits of the visit (short term)**

Better understanding of a BNCT work flow for a room-sized epithermal accelerator-based neutron source platform. The Helsinki facility had installed a Neutron Therapeutics machine, nuBeam, that uses a 2.6-MV, 30-mA proton accelerator to drive the neutron generation process. We discussed room layout, protection requirements and QA procedures.

Practical understanding of patient positioning and challenges in set-up and immobilization

Prescribing and treatment planning for BNCT.

Boron concentration determination requirements in a clinical system and rationale for timing of measurements.

Clinical trial planning and design planned by the team and ethical considerations and steps required for registration.

Understanding of staffing requirements for a BNCT facility.

Understanding of facility design, footprint and equipment and resources required for such a facility.

Understanding of QA, dosimetry and planned preventative maintenance (PPM) requirements.

Understanding of radiation protection aspects.

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| **12a. Envisaged benefits of the visit longer term (your own practice)** |
| Ability to discuss the planning of a BNCT facility in our institutions UCL and UCLH.<br><br>Consideration of developing and planning clinical trials and design to characterise the heterogeneous boron distribution within the tumour and body for current second-generation boronophenylalanine and forthcoming novel agents.<br><br>Undertake planning study for clinical situations and model estimates of best positions to treat patient supine or standing to aid optimal delivery of BNCT. |
| **12b. Envisaged benefits to the wider group (dissemination to others in your centre/clinical oncology community/multiprofessional team)** |
| Developing a grant application to support a building and deployment of a research / clinical BNCT facility in our institutions UCL and UCLH. |
| **13. Please outline any problems you encountered before, during or after your visit** |
| None. |
| **14. Any additional comments** |
| No. |
| **15. Do you have any 'top tips' that you would like to share with prospective visiting fellows?** |
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| **Signed:**  **Date: 10/07/2024** |

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| **Report approved by:** | Clinical Oncology Professional Support and Standards Board |
| **Date** | 11/7/24 |