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Jackson, S. A., & Prise, K. M. (2020). 125 years of BJR and radiological research: reflecting on the anniversary series in celebration of the world's oldest radiology journal. *The British journal of radiology*, *94*(1117), [bjr20219001]. https://doi.org/10.1259/bjr.20219001

Published in:
The British journal of radiology

Document Version:
Publisher's PDF, also known as Version of record

Queen's University Belfast - Research Portal:
Link to publication record in Queen's University Belfast Research Portal

https://doi.org/10.1259/bjr.20219001

Cite this article as:
Jackson SA, Prise KM. 125 years of *BJR* and radiological research: reflecting on the anniversary series in celebration of the world's oldest radiology journal 2021; **93**: bjr.20219001.

BJR 125TH ANNIVERSARY: EDITORIAL

125 years of *BJR* and radiological research: reflecting on the anniversary series in celebration of the world's oldest radiology journal

[1]SIMON A JACKSON and [2]KEVIN M PRISE

[1]Peninsula Radiology Academy, University Hospitals Plymouth NHS Trust, Plymouth, UK
[2]Patrick G, Johnston Centre for Cancer Research, Queen's University Belfast, Belfast, UK

Address correspondence to: Simon A Jackson
E-mail: *simon.jackson1@nhs.net*

Throughout 2020, we have celebrated the 125th anniversary of the world's oldest radiology journal, *British Journal of Radiology (BJR)*. As readers will be aware, in recognition of this important milestone, we commissioned and have published a broad range of predominantly modality-based Review articles. These have focussed on looking forward to the challenges and opportunities which lie ahead including key developments in CT, MRI, multimodality imaging, nuclear medicine and molecular imaging, interventional oncology, radiotherapy and tumour immunology, particle therapy, hypoxia, radiomics and quantitative imaging.

The anniversary series launched in January 2020 with an Editorial, "125 years of radiology research – *BJR*'s history is radiology's history",[1] by Adrian Thomas, Honorary Historian of the British Institute of Radiology (BIR). The Editorial mapped the interesting development of *BJR* from its origins in 1896 as the *Archives of Clinical Skiagraphy* to the present day.

This was followed in the February issue of *BJR* by an insightful "hot topic" Review by Issam El Naqa and colleagues entitled "Artificial Intelligence: reshaping the practice of radiological sciences in the 21st century".[2] The paper acknowledged the pioneering work of practitioners in the radiological sciences, developing and implementing artificial intelligence (AI) in many areas related to diagnostic imaging and therapy. The article reviewed the current status of AI and reflected on the challenges which need to be overcome in order to fulfil its potential of providing better and more affordable precision health care for both patients and wider society.

In April, we published a Review by Philippe Lambin and colleagues addressing another rapidly developing topic "Radiomics: from qualitative to quantitative imaging".[3] This focussed on the challenges surrounding quantification in imaging and how the emerging field of radiomics, whether handcrafted or deep, translates medical images into quantitative data to provide biological information and enable radiologic phenotypic profiling for diagnosis, theragnosis, decision support, and monitoring. And, thus contributing to the emerging era of precision medicine.

The abscopal effect first described in a seminal *BJR* article published during 1953 by RH Mole[4], was featured in May with a Review from Sandra Demaria and Silvia Formenti entitled "The abscopal effect 67 years later: from a side-story to center stage".[5] The article reviewed the history and clinically relevant role of the abscopal effect initiating a systemic immune response and its important impact in the separate fields of radiation therapy and cancer immunology.

In the June issue of *BJR,* Patrick Veit-Haibach and colleagues looked into the arena of nuclear medicine with a Review entitled "Nuclear Medicine and molecular imaging advances in the 21st century".[6] The paper focussed on the varied radiopharmaceuticals utilised in positron emission tomography, covering dual probe techniques and the impact of theranostic approaches used for the delivery of personalised medicine.

In July, Peter Börnert and David Norris addressed modality based diagnostic imaging with a paper entitled "A half-century of innovation in technology - preparing MRI for the 21st century".[7] Their insightful Review reflected on the development of MRI over the last half-century into what is today an indispensable non-ionising medical imaging technique due to excellent soft-tissue contrast resolution and variety of accessible tissue and

physiological parameters. The future application of AI in MRI was also highlighted.

John Boice and colleagues covered the field of radiation protection in the August issue with a paper entitled "Evolution of radiation protection for medical workers".[8] This reviewed the evolution of radiation protection over the past century to the present day. Covering advances in new technology and reflecting on the increasing requirement for radiation protection owing to an acceleration in medical radiation uses, paralleled with consideration for the safety of an enlarging medical radiation worker workforce.

Two anniversary Reviews were published in the September issue of *BJR*. Thomas Helmberger covered "The evolution of interventional oncology in the 21st century".[9] He reflected on the developments in the field as well as the synergistic future role interventional techniques will play in the field of immune-oncology. In particular, the possibility of tumour control at the cellular level. In addition, a Review by Griffin and colleagues addressed the important topic of damage to normal tissue arising from high-dose radiotherapy exposures in a paper entitled "History and current perspectives on the biological effects of high-dose spatial fractionation and high dose-rate approaches: GRID, Microbeam & FLASH radiotherapy".[10] Specifically, the development of advanced delivery modalities for achieving effective tumour control whilst sparing adjacent tissue at risk.

Juergen Debus and colleagues covered "Particle therapy in the future of precision therapy"[11] in the October issue. This followed on from the *BJR* special feature on proton therapy published in March 2020.[12] The Review summarised the important physical and radiobiological characteristics of accelerated charged particles using specific clinical examples of their clinical application.

Figure 1. Simon Jackson

In November, Dow-Mu Koh and colleagues returned to the topic of MRI with a Review entitled "What's new for clinical whole-body MRI (WB-MRI) in the 21st century".[13] This highlighted the increasing use of WB-MRI to survey disease across multiple sites and organ systems in the body thus reducing overall population medical radiation exposure. The paper addressed technical improvements in WB-MRI in addition to indications for the technique including disease screening, paediatric imaging as well as oncological and non-oncological applications.

In this issue, we include a comprehensive Review by Lynne Koweek and colleagues entitled "Multimodality Cardiac Imaging in the 21st century: evolution, advances and future directions".[14] The paper covers key developments in the field over the past 20 years including the increase in hybrid and fusion imaging techniques as well as the incorporation of AI and machine learning into clinical workflows. These advances helping to enhance patient management and clinical outcomes.

In the coming months, we will be publishing the final articles in order to complete the *BJR* 125th anniversary series. These will include a thought provoking Review by Matthias Prokop addressing the evolution of CT from the seminal paper by Godfrey Hounsfield in 1973[15] to the present day and beyond; and finally, a Review by Jens Overgaard which will highlight the 1953 seminal paper by L.H. Gray et al.[16] on the impact of tumour hypoxia in radiotherapy and reflecting on the latest developments in the field of translational radiation biology.

During these uncertain times, we very much hope that you have enjoyed reading the articles comprising *BJR* 125th anniversary series published to date, and we would like to take this opportunity to again personally thank all contributing authors for their time, insight and specialist expertise.

Figure 2. Kevin Prise

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