

A brief history of the Society of Radiopharmaceutical Sciences

Heinz H. Coenen *Institute of Neurosciences and Medicine, INM-5: Nuclear Chemistry, Forschungszentrum Juelich, 52425 Juelich, Germany*
E-mail address: h.h.coenen@fz-juelich.de.

1. Earlier activities

After radioactivity was discovered, only naturally occurring radio-active materials were available early in the last century. These and some artificial radionuclides produced by the few first cyclotrons, were primarily used to study the phenomenon of radiation itself, rather than as a tool to investigate chemical and physiological processes, according to György de Hevesy's novel tracer principle. It was not until advent of nuclear reactors and a more widespread presence of cyclotrons that beta-emitters, such as tritium and carbon-14, and the photon emitters technetium-99 m and iodine-123 became available, facilitating a wider *in vivo* application in the life sciences. The role of technetium-99 m and iodine-123 was transformative in the development of modern nuclear medicine. The need for radiolabelled compounds and radiopharmaceuticals, demanded the close cooperation between nuclear chemists, radiochemists, pharmacists, physicists and physicians. Beyond the therapeutic use of radionuclides, the administration of short-lived radioactive compounds to humans for diagnostic imaging required the preparation of radiopharmaceuticals at the point and time of use. This medical practice quickly evolved into nuclear medicine as a unique discipline. Rapid growth and spread of new devices, methods, and procedures were witnessed during the 1950s and especially the 1960s.

Consequently, small-scale national meetings on the preparation and medical application of radiopharmaceuticals were held during the 1960s. These were predominantly oriented to either medical treatment procedures or to, initially termed, *medical radionuclide imaging*. A series of five international meetings on the latter topic was organized by the International Atomic Energy Agency (IAEA) in 1959 (Vienna, Austria),

1964 (Athens, Greece), 1968 (Salzburg, Austria), 1972 (Monte Carlo, Monaco) and 1976 (Los Angeles, USA), and extensive proceedings thereof were published in each case. The first international symposia focussed on radiopharmaceuticals were organized by the IAEA, in Copenhagen in March 1973 “*New Developments in Radiopharmaceuticals and Labelled Compounds*” and by the Society of Nuclear Medicine (SNM), in Atlanta in February 1974 “*International Symposium on Radiopharmaceuticals*”. The cutting-edge outcome of both meetings was also documented by published proceedings.

2. Emergence of international symposia on radiopharmaceutical chemistry

In these pioneering events, organized by nuclear medicine physicians, several chemistry colleagues (many of them hot atom chemists, but also nuclear chemists and only few pharmacists) were involved, who became later major protagonists in our field of radiopharmaceutical chemistry. Among those were many well-known colleagues of ours, including Monte Blau, Walter Meyer-Borst, Yves Cohen, Dominique Comar, Aldo Mita, David Silvester, Mike Welch, and Alfred Wolf: almost all members of the founding committee of the first “*International Symposium on Radiopharmaceutical Chemistry*” (ISRC), to which Tadashi Nozaki and Gerhard Stöcklin were also co-opted. Given the time required for its preparation, the idea of organizing an international meeting among radiochemists was almost certainly started during the IAEA symposium in Copenhagen in 1973. Meetings at Sloan Kettering in New York, USA, in February 1974¹ and the symposium in Atlanta in 1974 appear to have been used as opportunities for organizational meetings in preparation for the formation of the ISRC symposia series.

The first ISRC meeting was planned to take place in the UK, hosted by David Silvester, Hammersmith

¹ Mentioned in M. Welch's “history talks” in the Aachen (2007) and Amsterdam (2011) ISRS meetings.

Hospital, the site of the first cyclotron wholly dedicated to research and application in medicine (installed as early as 1955, the second dedicated one at Washington University in St. Louis, USA, was established 1965). However, D. Silvester was affected by an unexpected medical issue in the run-up to the meeting, why he suggested to Al Wolf that they move the meeting to Brookhaven National Lab, Long Island, USA.² There, the first ISRC meeting was held in September 1976. The second meeting then was organized by D. Silvester in Oxford, UK, in July 1978 and the third by M. Welch in St. Louis, USA, in June 1980. Initially, the “international founding committee” comprised the 10 above-mentioned members, and later extended to 12 and then ultimately included former symposia chairs. It presided on committee membership and replaced members in the case of resignation or absence. Also, it launched the biennial format of the symposia with the following geographical sequence: America, Europe, America, Europe, Asia, approximating the continental prevalence of laboratories and scientists in the field at that time. The *Journal of Labelled Compounds and Radiopharmaceuticals* was chosen as the journal for publication of symposia proceedings.³

Eventually, the committee also selected the host and venue of future symposia, based on the scientific standing of the institution, which was endowed with full economic, organizational, and technical responsibility for the meeting. The symposium chair was tasked with assembling a scientific program committee from members of the founding committee and additional members of good standing to arrange the scientific program. At one point, a suggestion was raised to hold the ISRC meetings annually. As this was not fully endorsed by the founding committee, a compromise of a 1.5-year gap between meetings was given a trial after the ISRC in Paris (France, April 1992). This change, however, created unease in the community as the frequency was felt to be too short, why biennial meetings were resumed after the ISRC in Kyoto (Japan, October 1993). Subsequent symposia took place on uneven numbered years thereafter.

Two other series of symposia on special aspects of research on radiopharmaceuticals started shortly after the ISRC's formation and deserve to be also considered as roots of the SRS, since these were subsequently performed in cooperation with ISRS, and eventually merged with the SRS. One is the “*International Symposium on Technetium (and Other Radiometals in Chemistry and Medicine)*”, which started in 1982 in Bressanone, Italy. Given the strong tendency for research on radiopharmaceuticals for PET at the change of the century, the achievement of Ulderico Mazzi in keeping this meeting alive must be emphasised here. Nota bene, still today technetium-99m is the ‘bread and butter’ radionuclide used in nuclear medicine practice, and radio-metals find an increased use in radiotherapy presently.

The other series was the “*International Symposium on Radiopharmacology*”, an area of research indispensable for the transduction of radiolabelled compounds to radiopharmaceuticals. It addressed scientists of many disciplines interested in the biological application of radiochemicals. The first of these symposia was held in Innsbruck, Austria, in May 1978, and the second took place in Chicago, USA, in September 1981. Both were organized by Lelio Colombetti, who also was a founding member of the corresponding *International Association of Radiopharmacology* (IAR), and serving as its first president.

3. Formation of the society

After many years of the ISRC symposia running as a ‘non-formal’ organization, also in the radiopharmaceutical community the wish increasingly arose to create a formal scientific society with greater member representation, influence, and leadership on the steering committee. This was intensely discussed among colleagues and the members of the founding committee. Some were initially not in favor of the

² Personal communication from John Clark, UK.

³ This peer-reviewed journal was already established in 1965 and is published on behalf of the “*International Isotope Society*” by John Wiley & Sons, who generously sponsored all ISRC meetings.

formation of such a society, possibly because this meant the loss of their committee tenure and influence. However, after some lobbying, continued dialogue, and the suggestion that initially members of the existing ISRC committee should lead the society as president, the changes required to create a formal, bottom-up organized society with regular elections of the leadership were instigated. Then, the formation of a society was approved at the members' assembly during the ISRC in Interlaken in 2001. Mike Welch was elected as the first president, while Bill Eckelman was asked by the members' assembly to lead a working group on setting up the society's **By-Laws**, partly based on those of the SNM as a template. As a guiding principle, the by-laws aim to define the society's scope and rules for members and officers, while retaining some flexibility, and modifiable by the consent of the general membership body. [For the current version see SRS home page (<https://www.srsweb.org>)].

Another members' vote at Interlaken determined that the society should adopt a meeting format without parallel sessions - a rule that had been followed in preceding ISRC meetings. This happened partly in response to the attempt at arranging parallel sessions in radio-pharmacology and radiopharmacy during the 2001 meeting, following the modality of the ISRC in St. Louis in 1999, which was held in conjunction with the 11th “*International Symposium on Radio-pharmacology*” (as well as the 8th “*Workshop on Targetry and Target Chemistry*”). This, however, was found to hinder the participants' opportunity to attend all presentations. Instead, the increasing array of related interests in special or emerging topics were catered for by the addition of pre-conference workshops at subsequent symposia. To enable the coalescence of related radiopharmaceutical disciplines, radiopharmacy and radiopharmacology groupings were encouraged to affiliate and integrate with the SRS, and were given positions on the SRS board of directors, with six years of office, as for all directors. Before the positive vote for a society in 2001, there was a long debate about an appropriate society name. Several suggestions were made, and several colleagues favoured the inclusion of “biology” in the name.⁴

Gusti Schubiger, chairman of the ISRC in Interlaken, proposed the name “***Society of Radiopharmaceutical Sciences***” (SRS), which was agreed upon, since it appeared most suited to reflect the congregation of all various chemistry and life science disciplines under one umbrella. Surprisingly, the two subsequent meetings in Sydney 2003 and Iowa 2005 were still termed **ISRC** (as can be seen from the cover of abstract books of these meetings), and only at the Aachen meeting in 2007, the title “***International Symposium on Radiopharmaceutical Sciences***” (**ISRS**) was first used. The slow enactment of the ISRS name could only in part be due to the lengthy set-up of SRS by-laws since those had already been agreed on. Because of the increased growth of the society, it became apparent that the incorporation of full symposium management needed to be professionalized. This support was initially provided in form of developmental assistance by the SNM, for example with posting the by-laws. The full SNM management of SRS, however, became only effective upon Incorporation of the society as non-profit organization by the state of Virginia, US, (see Fig. 1) with the SNM as registering agent in 2008, starting with the 2009 ISRS in Edmonton.

Thus, the ISRS in 2007 can be regarded as the symposium of transition from the founding-committee ruled organization to that of a formal society. Still, the full responsibility for the operational organization and performance of the conference rested with the host institution, including fees, sponsoring, bursaries, housing, and abstract handling. The scientific program was arranged by a committee, half composed of members of the SRS board of directors, and the general financial management was taken care of by the SRS treasurer, Tom Ruth, who provided his service for two terms. Although non-professionally organized as the earlier ISRC and some later ISRS symposia, the ISRS 2007 proved very successful. Due to a strong participation and generous sponsorship, more than 100 student and trainee bursaries could be awarded, and surplus funds transferred to the subsequent symposium in

⁴ In analogy to the journal “Nuclear Medicine and Biology”, the official publication of the SRS, as is the “Quarterly Review on Nuclear Medicine and Molecular Imaging” since 2009.

Edmonton in 2009, enabled again about 100 bursaries.

During the presidential period of Heinz H. Coenen, Bill Eckelman (past), and Wynn Volkert (elect), a decision was made to also support smaller radiopharmaceutical-themed meetings with bursaries for students and trainees, acting upon one of the maxims of the SRS, *i.e.* the promotion and advancement of education in this area. For example, this was done for the *International Symposium on Radiohalogens* at Whistler, Canada, in 2008 and 2012, and the “*TERACHEM*” meeting at Bressanone, Italy, in 2010. In the latter case, the conference was held under the auspices of the SRS, enabling financial security upon request of the chairman Ulderico Mazzi. This ensured the meeting's continuity and has since been amalgamated as a regular SRS 4-yearly meeting. At that time also, the president led efforts to formally include radiopharmacy and radiopharmacology into the SRS. Accompanied by a well-received pre-conference workshop in Edmonton, organized by Sally Schwarz and Cathy Cutler (as president of IAR), this was eventually achieved. Together with the radiopharmacy group, the *International Association of Radiopharmacology* was officially merged with the SRS at the 2009 symposium and documented by amendment of the by-laws.

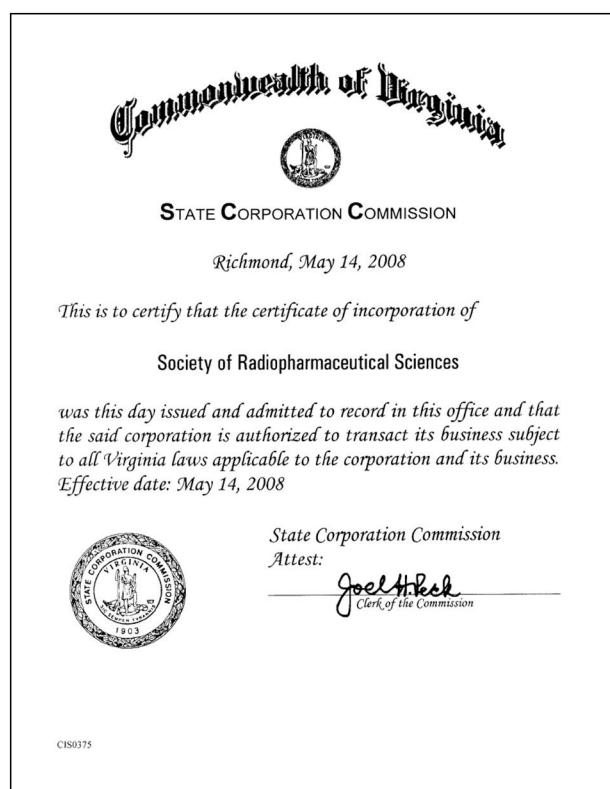


Fig. 1. Certificate of Incorporation of the SRS.

4. Newer developments

Some years after the foundation of the SRS, it had also been realized that more detailed guidelines and orderly procedures were required besides the principal by-laws. Following the ISRS 2007, president Heinz H. Coenen initiated the establishment of a **Code of Practice (CoP)**, a first draft being formulated with the strong support of Syed M. Qaim and Bill Eckelman. A special meeting, with the SRS board of directors invited, was held in form of a workshop in Juelich in 2009 to discuss and finalize this document, which was finally accepted at the general members' assembly in Edmonton in 2009. The CoP constitutes an important organizational step in the advancement of the SRS. It is primarily meant as a guideline for the SRS Board of Directors and the SRS Executive Director. It outlines day-to-day organizational and operational matters of the Society. Rather than strict regulations, the information outlined in the document

shall provide a framework of established practices, particularly for newly elected members of the SRS Board of Directors. It allows flexibility, and it can be readily adapted by the Board of Directors to accommodate any planned and unforeseen circumstances in the Society. Thus, further adaptations of these were made upon discussions of the Board of Directors at the Jeju symposium in 2013 under the guidance of the presidents Yasuhisa Fujibayashi (past), Bert Windhorst, and Henry VanBrocklin (elect). [The last amended version of the CoP is found on SRS home page.]

During the ISRS Edmonton in 2009 differences in operational aspirations between SNM and SRS representatives led to calls for independent administration support. Therefore, the SRS entered into an agreement with the association management company of ‘Metzger, Mabry & Associates, LLC’ on November 22, 2011, which started the management of the SRS on January 2, 2012, but only with the ISRS Beijing in 2019 the first meeting. The other four symposia in between (Amsterdam 2011, Jeju Island 2013, Columbia 2015, and Dresden 2017) were again organized and performed by the meeting Chairs with the support of their universities' management, or by local professional conference organizers. Another recent change is that the peer-reviewed journal *Nuclear Medicine and Biology* (published by *Elsevier*), has now been formally recognised as the official journal of the SRS and has assumed responsibility for abstract publications of the iSRS in 2021 (formerly published in JLCR) and of the Bressanone meeting in 2018 (formerly published as proceedings books by the Organizing Committee), bringing these groups closer together.

The progress and growth of the SRS have previously been communicated by *president's letters*, wherein organizational messages and announcements concerning the **Society** were published through the journal of *Nuclear Medicine and Biology*. Also, the names of current members of the SRS Board of Directors are given there. Bill Eckelman had introduced such letters as president in 2006, which were regularly continued during the presidency of Heinz H. Coenen and Wynn Volkert. Occasionally also representatives of the radiopharmacy/–pharmacology section used this as an opportunity for communication.

It is rather unfortunate that this tradition has declined during the following presidencies, since the information necessarily provided on the society's home page may be less traceable than these historic documents. [Chronological lists of presidents, ISRC/ISRS meetings, and their chairman are attached below.]

After the establishment of the bottom-up organization of the scientific international **Society of Radiopharmaceutical Sciences**, there has been an impressive growth in society membership. This can directly be seen by the ever expanding group photos, which are found for most symposia on the SRS home page (<https://www.srsweb.org/history>). Today, the society is a very strong and active organization. Just recently, its obvious vitality became evident by the flexible and efficient way, in which the acting board of directors under presidents Antony Gee, Jae Min Jeong (past), and Jason Lewis (elect), together with the professional management of Charles Metzger, met the challenges of the Covid pandemic. Not only was the 24th symposium organized as a dual meeting, first as virtual (eSRS), then as in person (iSRS), within a year, but also an eSRS Latin America and an eSRS Africa were performed. Additionally, the new initiative “Think Tank” (SRS-TT) was started as a virtual forum, primarily aiming at younger members as well as the establishment of the CAFACHEM (Carbon, Fluorine and Halogen Radiochemistry) meeting, which will be run every 4 years. Corporate partner support was gained for CAFACHEM as for TERACHEM since 2018, and for the latter events travel support will be provided as has been approved by the SRS Board.

Even more important than organizational developments and progress, however, is the enormous amount of creative research done and the wealth of results and progress achieved, as is also substantially reflected by the successful education of many productive younger colleagues we have today. Early pioneering developments of radiopharmaceutical sciences can be found in the slide presentations on ‘history’ by Mike Welch and Bill Eckelman on the SRS homepage. The latest progress and advancement

of radiopharmaceutical research and achievements are traditionally documented in the proceedings of ISRC/ISRS symposia and, of course, amply by detailed publications in pertinent, dedicated journals and books.

The potential of non-destructive and undisturbed *in-vivo* imaging as well as targeted radionuclide therapy with ‘mass-less’ radiolabelled compounds offers the prospect of exploiting this methodology for basic research in molecular biochemical function. Besides the use of radio-pharmaceuticals for the benefit of human health, the technique is being increasingly applied to additional areas of life and environmental sciences. Here, the SRS offers a splendid, invaluable platform for intense scientific communication, mutual exchange, and potential collaboration.

**Today, the Society of Radiopharmaceutical Sciences seems on a good trajectory:
On to the bright future!**

Acknowledgement

This report was gratefully compiled in good understanding with all past and present SRS presidents. The author is especially pleased to acknowledge many colleagues, who helped with valuable comments, hints or information about general and specific issues and data. These are (in alphabetic order) John Clark, Cathy Cutler, Bill Eckelman, Johannes Ermert, Tony Gee, Mikael Jensen, Charles Metzger, Stephen Moerlein, and Gusti Schubiger. Last, but not least, special thanks go to BE, SM and TG for their helpful advice and kind editorial support.

Presidents of the Society of Radiopharmaceutical Sciences

2001–2003 Michael J. Welch, USA
2003–2005 P. August Schubiger, Switzerland
2005–2007 William C. Eckelman, USA
2007–2009 Heinz H. Coenen, Germany
2009–2011 Wynn Volkert, USA
2011–2013 Yasuhisa Fujibayashi, Japan
2013–2015 Albert D. Windhorst, The Netherlands
2015–2017 Henry VanBrocklin, USA
2017–2019 Jae Min Jeong, South Korea
2019–2022 Antony D. Gee, United Kingdom
2022–2023 Jason Lewis, USA
2023–2025 Yuji Kuge, Japan

Dates, Venues and Chairladies/Chairmen of ISRC/ISRS Symposia

1st ISRC 1976, September 21–24, Brookhaven, USA (Alfred P. Wolf)
2nd ISRC 1978, July 3–7, Oxford, UK (David J. Silvester)
3rd ISRC 1980, June 16–20, St. Louis, USA (Michael J. Welch)
4th ISRC 1982, August 23–27, Jülich, Germany (Gerhard Stöcklin)
5th ISRC 1984, July 9–13, Tokyo, Japan (Tadashi Nosaki)
6th ISRC 1986, June 29–July 3, Boston, USA (Alun G. Jones)
7th ISRC 1988, July 4–8, Groningen, The Netherlands (Willem Vaalburg)
8th ISRC 1990, June 24–29, Princeton, USA (William C. Eckelman)
9th ISRC 1992, April 6–10, Paris, France (Dominique Comar)

10th ISRC 1993, October 25–28, Kyoto, Japan (Akira Yokoyama)
11th ISRC 1995, August 13–17, Vancouver, Canada (Thomas J. Ruth)
12th ISRC 1997, June 15–19, Uppsala, Sweden (Bengt Långström)
13th ISRC 1999, June 27–July 1, St. Louis, USA (Michael J. Welch)
14th ISRC 2001, June 10–15, Interlaken, Switzerland (P. August Schubiger)
15th ISRC 2003, August 10–14, Sydney, Australia (Bill Burch)
16th ISRC 2005, June 20–24, Iowa City, USA (Timothy Tewson)
17th ISRS 2007, April 30–May 4, Aachen, Germany (Heinz H. Coenen)
18th ISRS 2009, July 12–16, Edmonton, Canada (Steve McQuarrie)
19th ISRS 2011, August 28–September 2, Amsterdam, The Netherlands (Albert D. Windhorst)
20th ISRS 2013, May 12–17, Jeju Island, South Korea (Dae Yoon Chi)
21st ISRS 2015, May 26–31, Columbia, USA (Silvia S. Jurisson)
22nd ISRS 2017, May 14–19, Dresden, Germany (Jörg Steinbach)
23rd ISRS 2019, May 26–31, Beijing, China (Fan Wang)
24th eSRS 2021, May 17–19, iSRS 2022, May 29 – June 2, Nantes, France (Sandrine Huclier)
25th ISRS 2023, May 22–26, Hawaii, USA (Henry VanBrocklin)
26th ISRS 2025, date tbd, Gold Coast, Australia (Ginacarlo Pascali)