ENLIGHT: catalysing hadron therapy in Europe

As a pioneering multidisciplinary network celebrates its 10th anniversary, some of the founders recall how it all started.

Ten years ago, in February 2002, the European Network for Light Ion Hadron Therapy (ENLIGHT) had its inaugural meeting at CERN (CERN Courier May 2002 p29). About 70 specialists attended this first gathering from different disciplines, including radiation biology, oncology, physics and engineering. This was a considerable achievement, coming at a time when “multidisciplinarity” was not yet a buzz-word. The EU-funded project, coordinated by the European Society for Therapeutic Radiology and Oncology (ESTRO), came to an end in the summer of 2005 with the final meeting in Oropa, in the Italian Alps. Here, it was widely acknowledged that ENLIGHT had been a key catalyst in building a European platform to propel hadron therapy forwards. The encouraging results motivated the community to discuss how to maintain and broaden the network (CERN Courier October 2005 p31).

Less than a year later, in March 2006, more than 100 scientists from 20 European countries arrived at CERN for the preparatory meeting of ENLIGHT++; the two plus signs indicate more countries and more hadrons with respect to the previous project (CERN Courier June 2006 p27). The enlarged group of participants agreed that the goals of the network could be met best through two complementary approaches: research in areas needed for highly effective hadron therapy; and networking to establish and implement common standards and protocols for treating patients. The primary mandate of ENLIGHT++ is therefore to develop strategies for securing the funding necessary to continue the initiative in these two fundamental aspects, mostly through dedicated EU projects, while the network itself carries on without specific funding.

A growing success

Since starting in 2002, ENLIGHT has been growing steadily and it now counts some 400 participants from more than 20 countries across Europe. It entered its second decade with four EC-funded projects under its umbrella: PARTNER (which came to an end in September), ULICE, ENVISION and ENTERVISION, with total funding of €24 million. All of these projects are directed towards the different aspects of developing, establishing and optimizing hadron therapy.

The success of ENLIGHT and ENLIGHT++ is the result of years of work aimed towards a unified approach towards hadron therapy in Europe. Here, some of the key players from the birth of ENLIGHT share their personal recollections of those early years.

J-P Gérard, Centre Antoine-Lacassagne, Nice and ESTRO

“ENLIGHT was launched in 2002 as a result of several years of European activity in the field of hadron therapy. Indeed, as early as the 1970s, particle-beam therapy was already considered an attractive field of research (J P Gérard et al. 1978). In the 1980s, the EULIMA project – established in collaboration with CERN – was the first European attempt to design a cyclotron to produce carbon-12 ions. The award of an honorary degree to Ugo Amaldi by Lyon University 1 in 1997 marked the origin of the ETOILE project for a carbon-ion facility in Lyon, which is now part of the ‘France HADRON’ project.

“At that time, radiation oncologists in Germany, Italy, Switzerland and Austria were actively engaged in the design of accelerators to produce protons and carbon-ion beams through the Proton Ion Medical Machine Study (PIMMS). I was president of ESTRO in the period 1999–2001, and the European Framework Programme offered a good opportunity to initiate a co-operative European action that would bring together all of the teams interested in the field.
“Thanks to the energy and vision of Germaine Heeren, the general secretary of ESTRO, it was possible to create the ENLIGHT group. A memorandum of understanding was signed in collaboration with CERN in 2002 and this became the basis of a call for a grant from the EU 5th Framework Programme (FP5). The grant was of a modest amount but represented a strong incentive to create, with the support of CERN, a dynamic collaboration between all of the radiation oncologists and physicists involved in this great hadron adventure. It is a real pleasure to see – 10 years later – that the dreams of these pioneers are becoming reality in Heidelberg, Pavia and other European centres, for the benefit of paediatric and adult patients.”

Richard Pötter, Medical University of Vienna

“ENLIGHT was founded on the basis of various developments in the field of particle therapy during the 1990s. Specific projects in different European countries had been conceived of but there was the common vision that these initiatives had to come together to strengthen efforts globally and establish light-ion radiotherapy successfully. Within ESTRO, a working group had already been initiated by prominent members of various European projects. This group prepared a comprehensive programme that included a range of topics, such as patient-selection modalities, preparation of clinical trials, technology, biology, imaging and health economics.

“An essential step forward was the decision to apply for an EC grant under the 5th Framework Programme, to fund the development of ENLIGHT with regards to these topics. The application was successful, so this European network gained a unique opportunity to enhance its activity through the different working groups and regular meetings, over a period of three years.”

Ugo Amaldi, TERA Foundation

“For me, the ENLIGHT project started with an e-mail received on Saturday 6 October 2001 from Germaine Heeren, secretary general of ESTRO. The subject line was “ESTRO Hadrons project – VERY URGENT” and it was addressed to many European radiation oncologists and physicists. The purpose – defined in a meeting chaired by Richard Pötter in December 2000 and better focused in a second meeting called by Jean-Pierre Gérard, who at the time was ESTRO president – was to submit a proposal by 18 October to the European FP5.

In the e-mail, I was asked to co-ordinate the “theoretical physics and engineering part” of the proposal. Hans Svensson and Jean-Pierre Gérard had already been given the responsibilities of the ‘physics part’ and ‘the clinical tasks’, respectively.

“Since there were less than two weeks to the deadline, I exchanged the first e-mails with Germaine Heeren on Sunday and as of Monday morning I contacted all of the European groups that I knew. Most of them were informed of the fact that something was on the move and everybody said that, in principle, they agreed – but few people were ready to contribute to the write-up. Thus, I had to do a lot of the work myself, helped by Hans Svensson, but I still remember those hectic days with pleasure, because for me a European project initiated by ESTRO was the completion of 10 years of activity.

“In fact, the TERA Foundation had been conceived of in 1991: PIMMS, which was initiated at CERN by Meinhard Regler and myself in 1995 and led by Phil Bryant, had completed the design of an optimized proton–carbon synchrotron; and, last but not least, the Italian health minister, Umberto Veronesi, was drafting the law financing CNAO (the National Centre for Oncological Hadron Therapy), which was based on a modified version of PIMMS. A European project would have been the best framework for the next steps. Towards the end of the writing, there were some difficult moments – and here the intervention of Jürgen Debus was instrumental.”
“I sent the text – for which Walter Henning had written a pref-
ace and Gerard Kraft had contributed the radiobiology part – to
Germaine Heeren around noon of 18 October. The approval of
ENLIGHT came on 6 February 2002, just one week before the
opening of the inaugural meeting. This was held at CERN, fol-
lowing our request, supported by Hans Hoffmann who was then
CERN’s director for technology transfer and scientific comput-
ing, and Luciano Maiani, CERN’s director-general at the time.”

Vision for 2022
ENLIGHT held its 10th anniversary meeting on 15 September
2012 at CNAO, in Pavia, with a look back at its founding, cur-
rent progress and future challenges. Summarizing the histori-
cal perspective, Richard Pötter proposed building a European
multicentre hadron therapy collaboration in close co-operation
with ESTRO, EORTC and other key players in radiation oncol-
ogy. This would gather under one umbrella the best clinical
practices, research and development, together with education
and training.

Progress in this young and vigorously developing scientific and
medical discipline will be possible through joint basic and trans-
lational biology, clinical research and physics research. What it
now requires is younger leadership, to be recruited from the many
young and talented participants at the 10th anniversary meeting.

Further reading
For more on the ENLIGHT network, see www.cern.ch/enlight.

JP Gérard et al. 1978 J Radiol. 60 691.

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