

Cancer and European Network for Light Ion Hadron Therapy (ENLIGHT)

Friday 16 October 2020 10:10 (35 minutes)

Cancer is a critical societal issue. Worldwide, in 2018 alone, 18.1 million cases were diagnosed, 9.6 million people died and 43.8 million people were living with cancer. Current projections anticipate an increase with approximately 24.6 million newly diagnosed patients, 13 million related deaths by 2030.. The efforts that are currently carried out worldwide to improve the effectiveness of RT have the potential to change the forecasts for the upcoming years. The main goal of Advanced Radiotherapy Treatment is to maximise the damage of ionising radiation to the tumour cells while minimising exposure of the surrounding normal tissue and critical organs. To achieve this goal, RT has considerably progressed with the development of new technologies and methodologies able to increase the conformity of the dose delivered to deep-seated tumours. While the most frequently used modern RT modalities still rely on high energy (MeV) X-rays, there is a rapidly growing interest and adoption of accelerated charged particles.

Radiotherapy using charged hadrons (protons and light ions), with their unique physical and radiobiological properties, allows highly conformal treatment of various kinds of tumours, while delivering minimal doses to large volumes of surrounding healthy tissues. Harnessing the full potential of hadron therapy requires the expertise and ability of physicists, physicians, radiobiologists, engineers, and information technology experts, as well as collaboration between academic, research, and industrial partners.

It was in response to these challenges that ENLIGHT –the European Network for Light Ion Hadron Therapy (<http://www.cern.ch/enlight>) –was launched which had its inaugural meeting at the European Organization for Nuclear Research (CERN) in February 2002, today has more than 1000 participants from over 30 countries in Europe and beyond. Harnessing the full potential of particle therapy requires the expertise and ability of physicists, physicians, radiobiologists, engineers, and information technology experts, as well as collaboration between academic, research, and industrial partners.

The given report highlights the status and the main new directions of hadron therapy in Europe and in the world with the emphasis on the international cooperation that is of crucial importance in combat of the disease.

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Session Classification: Plenary

Track Classification: Section 8. Nuclear medicine.