ENLIGHT and Specific Projects: PARTNER, ULICE, ENVISION - M. Dosanjh

ENLIGHT and specific projects: PARTNER, ULICE, ENVISION

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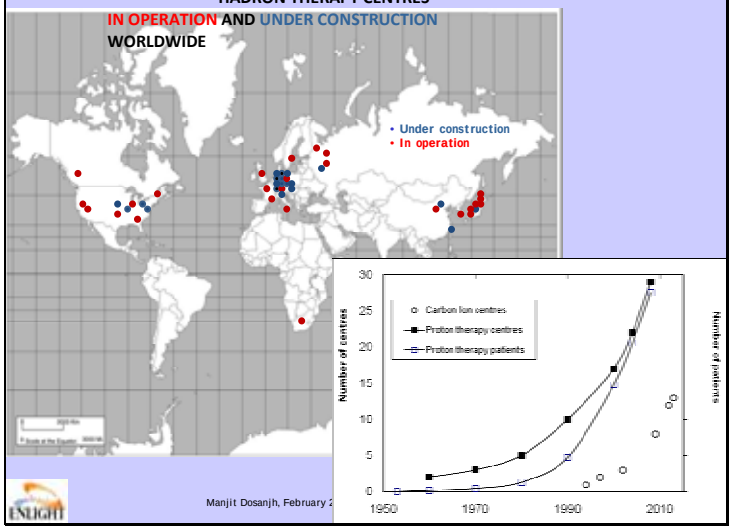
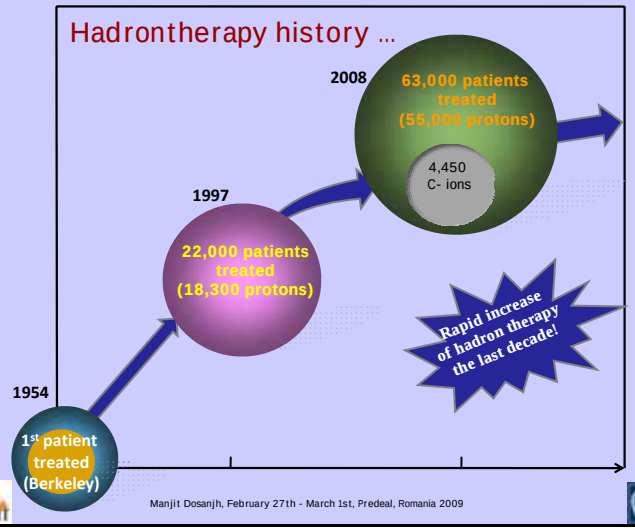
ENLIGHT Coordinator & CERN

HADRON THERAPY CENTRES

IN OPERATION AND UNDER CONSTRUCTION
WORLDWIDE



Hadrontherapy history …

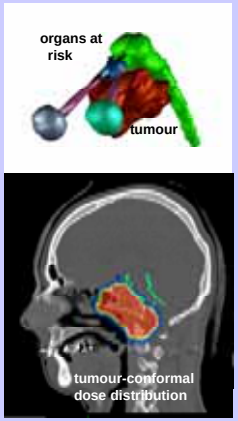


List of European Facilities

- Clatterbridge (England)
- Dubna (Russia)
- HZB (HMI), Berlin (Germany)
- INFN-LNS, Catania (Italy)
- ITEP, Moscow (Russia)
- Nice (France)
- Orsay (France)
- PSI, Villigen (Switzerland)
- St.Petersburg (Russia)
- Uppsala (Sweden)
- G.S.I. Darmstadt (carbon)
- CMHPTC, Ruzomberok (Slovak Rep.)
- CCSR, Bratislava (Slovak Rep.)
- CNAO, Pavia (Italy)*
- HIT, Heidelberg (Germany)*
- Med-AUSTRON, (Austria)*
- NRoCK, Kiel (Germany)*
- PMHPTC, Protvino (Russia)
- PTC, Marburg (Germany)*
- RPTC, Koeln (Germany)
- RPTC, Munich (Germany)
- Skandion Clinic, Uppsala (Sweden)
- Trento (Italy)
- WPE, Essen (Germany)
- ETOILE
- ARCHADE

Hadrontherapy goals

- Provide the irradiation technologies and the detection systems to optimally use the advantages of charged particles
- Optimize the dose to the tumour by beam scanning and adaptation of the delivery e.g. organ motion, respiration
- Treat 1000 patients per year and perform clinical trials using low-LET (p, He) and high-LET (C, O) beams
- Conduct technical, physical and clinical R+D



What do we need for these objectives?

- Trained researchers in this new multidisciplinary field
- Access to the facilities and beam time for resaerch
- Hands-on experience for the clinical staff and researchers
- Information sharing and networking
- Improving present technologies/facilities
- Funding …….

PARTNER

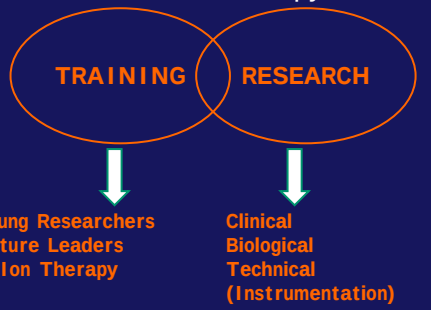
PARTNER was established for reinforcing research and the training of professionals in the rapidly emerging field of hadron therapy.

It is a project funded by the EU-FP7 for training in clinical, biological and technical developments at a pan-European level.

(http://www.cern.ch/partner)

THE PARTNER PROJECT

PARticle **T**raining **N**etwork for **E**uropean **R**adiotherapy



Young Researchers
→ Future Leaders in Ion Therapy

Clinical
Biological
Technical
(Instrumentation)

Key details for PARTNER

- ✓ Contribution from European Commission: **5.6 M€**
- ✓ 25 young researchers
- ✓ PARTNER wide training in all collaborating institutes
- ✓ 20 technical training workshops in hadron therapy

open to all young researchers:

www.cern.ch/partner

THE PARTNER PROJECT

- **Ten Institutes:**
  CERN (Project Coordinator), CNAO, GSI, UKL-HD (HIT), KI, UNIS, TERA, MEDAUSTRON, ETOILE, IFIC
- **Two leading companies in particle therapy:**
  IBA, SIEMENS
- **Multi-disciplinary research:**
  Radiobiology, Dosimetry, Treatment Planning, Novel gantry design, Simulations, Clinical studies
- **Mobility of researchers and a common network**

ULICE

Union of Light Ion Centres in Europe

EC FP7 Infrastructure for 8.4 M€ start April 2009

ULICE addresses the key issues of:

the exploitation of the newly emerging facilities(HIT, CNAO…)
open access to information
improvement of technologies of existing and upcoming facilities

ULICE structure :

- Overall coordination: CNAO
- Trans-national access: HIT
- Joint research activities: Vienna University
- Networking activities: CERN

ULICE: Transnational access

- provide **beam-time for external researchers through several clinical trial programmes** aimed at improving different technical aspects of the facilities.
- provide **beam-time through 'open requests' from external researchers for radiobiological and physics experiments**

ULICE: Joint Research Activities

- develop methods to match the volume treated by **active scanning particle beams** to the target volume
- **identify tumours** that need the superior physical selectivity provided by ion beams
- develop/investigate a **new carbon ion gantry design**
- develop **computer assisted patient selection program** based on epidemiologocal and other data

ENVISION
European Novel imaging systems for in vivo monitoring and quality control during tumour ion beam therapy

ENVISION attacks the problems both of on-line Dose Monitoring and of performing accurate Quality Assurance tests by developing novel imaging modalities that are related to the dose deposition and allow assessing the treated volume as well as deriving reliable indicators of the delivered dose.

ENVISION

Key challenge for specific technology

- In-vivo monitoring of delivered dose and quality assurance for clinical therapy.
- Development of novel techniques in five strongly correlated hardware and software fields:
  - ***In-beam PET monitoring***
  - ***Monitoring with single particles***
  - ***In-vivo dosimetry and moving organs***
  - ***In-vivo dosimetry, treatment planning & clinical relevance***
  - ***Monte Carlo simulations of in-vivo dosimetry***

ENVISION

ENVISION will complement ULICE project in that it focuses on investigating and increasing the potentials and quality of time-resolved in beam PET imaging for real-time in-vivo dosimetry of moving targets.

Enlight: www.cern.ch/enlight

Next conference: 18-19 June Valencia

PARTNER: www.cern.ch/partner

Training courses, vacancies for researchers etc