The main goal of radiotherapy is to irreversibly damage tumor cells, whereas the cells of healthy tissue are damaged “only reversibly” or not at all. Proton therapy currently comes closest to this goal.
Our Facility

- Advanced clinical center with the newest and highly exact technology for treatment of patients with cancer – pencil beam
- Newest methods of active beam scanning, robotic verification systems and facilities for fixing patients
- 2,000 patients a year
- 5 treatment rooms including a treatment room for the treatment of eye tumors complete diagnostic equipment - CT, MRI and PET/CT camera
- Planning CT and MRI
Dr. Jiří Kubeš, Ph.D.
**Head of Proton Therapy**
Has gained work experience in leading positions as a radiation oncologist at several institutions. Besides being an active lecturer, he specializes in prostate carcinoma and head and neck tumors.

Dr. Barbora Ondrova
**Radiation Oncologist**
Specializes in lung carcinoma and pediatric carcinoma. She is a member of the Czech Society for radiation oncology, biology and physics. Barbora is responsible for children treatment program at PTC.

MSc. Vladimír Vondráček
**Head of Medical Physics**
Gained lots of experience in medical physics and nuclear protection at several institutions. Actively cooperates on educating medical physicists and preparing international projects in nuclear research. He appreciates working with the great technology of proton therapy.
Proton technology

CYKLOTRON PROTEUS 235

PENCIL BEAM SCANNING

TRANSPORT SYSTEM

PATLOG – efficient transport

FIXED BEAM
GANTRY 1
GANTRY 2
GANTRY 3
EYE BEAM

SLICE-BY-SLICE IRRADIATION
FAST REPOSITIONING
Conventional x Proton

Tumor Dose is less than the entry dose.

Dose is also delivered beyond the tumor target.

Highest Dose is at the depth of the tumor target.

Entry dose is low.

Highest Dose is near the point of beam entry.

There is NO exit dose beyond the target.

CONVENTIONAL RADIATION THERAPY: Deposits most energy before target

TARGETED PROTON THERAPY: Deposits most energy on target
Ways to PTC

- Insurer
- Oncology Board
- Partner
- Patient Himself
Environment

Modern Examination Rooms

Children Treatment Program
Treatment Info

- Complete medical examination
- Medical imaging (PET/CT, CT, MR)
- Treatment planning
- Patient positioning and immobilization systems
- Treatment itself

WE TREAT:

- Pediatric tumors
- Head and neck tumors
- Tumors of the brain and base of the skull
- Malignant melanoma of the eye
- Lung tumors
- Prostate cancer
- Pancreatic cancer
- Esophageal cancer
Tumors in children

**Indication**
- Medulloblastoma
- Craniopharyngeoma
- Gliomas
- Ependymomomas
- Sarcomas

**Benefits**
- Lower risk of:
  - growth abnormalities
  - cognitive dysfunction
  - secondary cancers

Proton therapy significantly decreases the impact of treatment on hormonal function, growth and development of children.

<table>
<thead>
<tr>
<th>Side Effect</th>
<th>Protons</th>
<th>Conventional Radiotherapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restrictive Lung Disease</td>
<td>0%</td>
<td>60%</td>
</tr>
<tr>
<td>Reduced exercise capacity</td>
<td>0%</td>
<td>75%</td>
</tr>
<tr>
<td>Abnormal EKGs</td>
<td>0%</td>
<td>31%</td>
</tr>
<tr>
<td>Growth abnormality</td>
<td>20%</td>
<td>100%</td>
</tr>
<tr>
<td>Risk of IQ score &lt; 90</td>
<td>15%</td>
<td>25%</td>
</tr>
</tbody>
</table>
Brain tumors

**Indication**
- Low grade gliomas
- Base of skull tumors
- Paraspinal tumors
- Meningeomas
- Solitary brain metastases
- Arteriovenous malformations

**Benefits**
- Better dose distribution
- Protection of healthy tissue
- Less of urgent and chronic complications

Proton therapy does not affect the healthy eye and the surrounding vital structures of brain.
Head and neck tumors

**Indication**

Tumors of: paranasal sinuses
dipopharynx
oropharynx
larynx
salivary glands

**Benefits**

Lower risk of blindness
Reduction of xerostomia
Lower risk of dysphagia (acute and permanent)

**Proton therapy decreases the risk of damaging swallowing paths and salivary glands and keeps you the ability to eat what you like.**

<table>
<thead>
<tr>
<th>Side Effect</th>
<th>Protons N=200*</th>
<th>Conventional Radiotherapy (Photons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blindness (maxillary sinus tumors)</td>
<td>2%</td>
<td>15%</td>
</tr>
<tr>
<td>Xerostomia (Dry mouth)</td>
<td>&lt; 5% (with protons alone)</td>
<td>100%</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>12 %</td>
<td>100% 80% require liquid nutrition</td>
</tr>
<tr>
<td>Require liquid nutrition</td>
<td>0%</td>
<td>30%</td>
</tr>
</tbody>
</table>
Lung carcinoma

**Indication**
- Non-small cell lung cancer
- Oesophageal cancer

**Benefits**
- Higher dose to tumor
- Lower dose to healthy lung
- Irradiation of larger tumors with higher dose

Proton therapy increases the chance of a cure in lung cancer and saves the healthy lung.

<table>
<thead>
<tr>
<th>Acute Side Effects</th>
<th>Protons</th>
<th>Conventional Radiotherapy (Photons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea/Vomiting</td>
<td>0%</td>
<td>30%</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>0%</td>
<td>16%</td>
</tr>
<tr>
<td>Esophagitis</td>
<td>&lt;5%</td>
<td>31%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>&lt;5%</td>
<td>23%</td>
</tr>
<tr>
<td>&gt; 5 lb. weight loss</td>
<td>0%</td>
<td>34%</td>
</tr>
</tbody>
</table>
Proton therapy offers a new chance to cure tumors of pancreas, liver, esophagus or rectum.
Prostate carcinoma

**Indication**
- Primary curative radiotherapy
- Adjuvant or salvage radiotherapy after surgery

**Benefits**
- Lower risk of rectal bleeding
- Lower risk of impotence
- Shorter course of radiation
- Dose escalation

Proton therapy significantly reduces the risk of impotence, incontinence and rectal side effects.
Lymphoma

**Indication**
- Lymphomas in the chest area
- Lymphomas in the abdomen and pelvic regions
- Lymphomas near the head and neck
- Hodkin and Non-Hodin Lymphoma

**Benefits**
- Reduced dose to the spinal cord by up to 70%
- Reduced dose to the heart and oesophagus by 50%
- Reduced radiation dose to the breast in women

Proton radiotherapy offers young patients with lymphoma the chance of a healthy future.
Our projects

2009  Starting the building project
2012  Treating the first patient
End 2013 Two shift operation
2018  Opening center in Moscow
2019  Supervision of UK projects
Main Benefits

• The state of art technology – most precise and safe method of pencil beam scanning
• Shorter treatment time (higher doses)
• Very short admission time
• Affordable prices – especially in comparison with the costs of proton therapy in the United States
• Professional approach and patient management – involving arrangement of additional patient services - accommodation, free time activities or personal interpreter
Specialised cooperation

- **Mutual multidisciplinary teams**
- Short-term and long-term internships for medical professionals in radiation oncology
- On-spot practice during treatment of the patients
- Communication with your doctors
- Logistics of the new unit in the future