IOVU ACTIVITY

- Scientific staff – 43
- Areas of science directions – 3
- Scientific laboratories – 4
- Scientific programmes - 4
- Biobank

- Physicians – 158
- Care and diagnostics specialists – 338
- Outpatient Clinic visits more than 110000 pts/year
- Treated 12348 pst/year

- Students(I–III level)
- Defended 2 dissertations
- Training courses

- Epidemiological studies
- Compilation of statistical data
- Implementation of 4 prevention programmes
- Ca registry

Projects supported by:
- Research council of Lithuania – 8
- State capital investment – 1
- EU structural funds – 8
- International – 5
- Other– 2
PRIORITIES OF ONCOLOGY SCIENCE

• Multidisciplinary attitude towards oncology problems
• Close relation between fundamental and clinical science
• Scientific research directed towards patient
• Unity of oncological science, education and practice
Areas of science approved by the Lithuanian Government

- Development of tumor prevention based on epidemiologic, experimental, molecular and clinical investigations
- Development of new technologies and methods of early cancer detection, diagnoses and treatment
- Improvement of life quality of cancer patients
INSTITUTE OF ONCOLOGY, VILNIUS UNIVERSITY
4 SCIENTIFIC PROGRAMMES

- THE RELATIONSHIP BETWEEN ORGANISM AND TUMOR: EPIDEMIOLOGICAL, LABORATORIAL AND EXPERIMENTAL STUDIES
- QUALITY ASSURANCE OF LIFE FOR ONCOLOGICAL PATIENTS
- TOWARD INDIVIDUALIZED CANCER THERAPY
- UPGRAADING CANCER DIAGNOSTICS
## VISITS IN OUTPATIENTS CLINICS

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visits</td>
<td>109,468</td>
<td>118,030</td>
</tr>
<tr>
<td>First time</td>
<td>15,259</td>
<td>16,315</td>
</tr>
<tr>
<td>Oncological</td>
<td>74,498</td>
<td>78,660</td>
</tr>
<tr>
<td>Non-oncological</td>
<td>4,965</td>
<td>4,882</td>
</tr>
</tbody>
</table>
HIGH FREQUENCY RADIOABALATION

Total – 350 pts.
LOCATIONS OF RADIOABLATION METHOD 2006-2012 yr.
<table>
<thead>
<tr>
<th>Equipment</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total:</td>
<td>14</td>
</tr>
<tr>
<td>Mobile X-Ray</td>
<td>3</td>
</tr>
<tr>
<td>Stationary X-Ray</td>
<td>2</td>
</tr>
<tr>
<td>Mamographs</td>
<td>3</td>
</tr>
<tr>
<td>Stereotactic biopsy digital system</td>
<td>1</td>
</tr>
<tr>
<td>Angiograph</td>
<td>1</td>
</tr>
<tr>
<td>CT</td>
<td>1</td>
</tr>
<tr>
<td>Digital control system</td>
<td>1</td>
</tr>
<tr>
<td>Diagnostic ultrasound device</td>
<td>1</td>
</tr>
<tr>
<td>MRI</td>
<td>1</td>
</tr>
</tbody>
</table>
We are most interested in functional imaging, such as CT perfusion, MRI perfusion, diffusion, MRI whole body diffusion. Radiofrequency ablation, cryoablation.
Our current activities in this field are CT perfusion in cervical cancer patients prior and post chemoradiotherapy. CT perfusion for rectal cancer patients prior, during and post chemoradiotherapy before surgery.

**Equipment:**
- MRI 1.5 T Philips Achieva;
- CT GE Lightspeed Pro32
- Digital mammography system, Hologic, Selenia with CAD
- Digital mammography system with tomosynthesis, Hologic
PTS TREATED IN ONCOSURGERY CENTRE
2009-2011

- 2009: 7437
- 2010: 7104
- 2011: 7627
ONCOSURGERY CENTRE
SURGERY - 5982

2011

- Chest: 493
- Head & Neck: 608
- Pelvic: 1245
- Urology: 1397
- Gynecology: 721
- Breast: 1518
CENTER OF RADIATION AND MEDICAL ONCOLOGY

- External 2D
- External 3D
- Brachytherapy
- Radioactive ($^{131}\text{I} + ^{89}\text{Sr}$)
- IMRT
- Combined therapy (chemotherapy + 3D)
- Combined therapy (chemotherapy + IMRT)

**New methodology**

- Prostate LDR and HDR brachytherapy
- Hypofractionated breast EBRT
- Hyperfractionated lung Ca EBRT
- Golden markers for prostate navigation
<table>
<thead>
<tr>
<th>No</th>
<th>Radiotherapy units (installation time)</th>
<th>Technical characteristics</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LG CLINAC 600C/D (2009)</td>
<td>MLC -80 (1 cm leaves); 6 MV</td>
<td>VARIAN</td>
</tr>
<tr>
<td>2</td>
<td>LG CLINAC 2100 (2006)</td>
<td>MLC – 120 (0.5 cm leaves); 6 ir 15 MV; PI</td>
<td>VARIAN</td>
</tr>
<tr>
<td>3</td>
<td>LG CLINAC 2100 (2007)</td>
<td>IMRT; MLC – 120; 6 ir 15 MV; PI</td>
<td>VARIAN</td>
</tr>
<tr>
<td>4</td>
<td>LG CLINAC IX (2011)</td>
<td>OBI (CBCT ir 2-D/2-D kV verification); IMRT; IGRT; MLC – 120; 6 &amp; 15 MV; PI</td>
<td>VARIAN</td>
</tr>
<tr>
<td>5</td>
<td>RT OPTIMA CT (2011)</td>
<td>Virtual simulation; CT with contrast</td>
<td>GE Systems</td>
</tr>
<tr>
<td>6</td>
<td>XIMATRON C SERIES (2002)</td>
<td>X-Ray tube</td>
<td>VARIAN</td>
</tr>
<tr>
<td>7</td>
<td>X-Ray device T-105 (2011)</td>
<td>100 kV</td>
<td>Wolf-Medizintechnik GmbH</td>
</tr>
</tbody>
</table>
PTS TREATED IN CENTER OF RADIATION AND MEDICAL ONCOLOGY 2009-2011

- 2009: 4481
- 2010: 4865
- 2011: 4750
## RADIOTherapy 2011

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBRT</td>
<td>1957 pts</td>
</tr>
<tr>
<td><strong>BRACHYTHERAPY</strong></td>
<td>169 pts</td>
</tr>
<tr>
<td>$^{131}$ J</td>
<td>805 pts</td>
</tr>
<tr>
<td>$^{89}$ Sr</td>
<td>14 pts</td>
</tr>
<tr>
<td></td>
<td><strong>2945 pts</strong></td>
</tr>
</tbody>
</table>

2012 yr. – IMRT 324 pts. H&N and prostate (17 %)
<table>
<thead>
<tr>
<th>Tumour Localization</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>405 pts</td>
</tr>
<tr>
<td>Prostatae</td>
<td>328 pts</td>
</tr>
<tr>
<td>Gyneacologic</td>
<td>805 pts</td>
</tr>
<tr>
<td>Head + Neck</td>
<td>106 pts</td>
</tr>
<tr>
<td>GJ</td>
<td>90 pts</td>
</tr>
<tr>
<td>Lung</td>
<td>83 pts</td>
</tr>
<tr>
<td>Heamatologic</td>
<td>30 pts</td>
</tr>
<tr>
<td>Brain</td>
<td>29 pts</td>
</tr>
<tr>
<td>Other</td>
<td>81 pts</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1957 pts</strong></td>
</tr>
</tbody>
</table>
CLINICAL TRIALS

160-200 Pts are included per year.

- 2011, 30, 25%
- 2010, 33, 27%
- 2009, 25, 20%
- 2008, 34, 28%

2012 – 45 clinical trials (1 in radiotherapy)

Urgent need more clinical trials including radiotherapy
VISUALLY

TO CONSTRUCT

THE BRIDGE

IOVU
SRC

CLINIC
(PATIENTS)

SCIENTIFIC
KNOWLEDGE

RIVER
HEAD – dr. V. Atkočius
Chief scientist – prof. dr. J. Didžiapetrienė

LABORATORY OF CARCINOGENESIS AND TUMOUR PATHOPHYSIOLOGY
LABORATORY OF IMMUNOLOGY
LABORATORY OF MOLECULAR ONCOLOGY
LABORATORY OF BIOMEDICAL PHYSICS
BIOBANK

STAFF: 43 workers, including 7 chief scientists, 12 senior research fellows, 10 research fellows, 15 junior research fellows
The following experimental and clinical studies are performed:

• the role of human papillomavirus in cervical carcinogenesis is analysed

• anti-oxidative system and cytokines changes during the treatment process are evaluated

• experimental studies *in vivo* related to chemical carcinogenesis and anticarcinogenesis are performed
COLLABORATION WITH OTHER INSTITUTIONS

LABORATORY OF CARCINOGENESIS AND TUMOUR PATHOPHYSIOLOGY

Institute of Immunology, Vilnius University

Institute of Biotechnology

National Centre of Pathology

Vilnius University Clinic of Obstetrics and Gynecology

Department of Human and Medical Genetics, Vilnius University

St. Elisabeth hospital, Herentals, Belgium
Laboratory of Immunology

The following experimental and clinical studies are performed:

- Prognostic and predictive immunological biomarkers for immunotherapy of urinary bladder tumours and skin melanoma
- Regulatory properties of T lymphocyte subsets in peripheral blood of patients with renal cell carcinoma, melanoma and small cell lung carcinoma
- Analysis of pancreatic cancer stem cell immunotype, gene expression and therapeutic response *in vitro*
- Characterisation of cancer stem cells in pancreatic carcinoma cell lines
- Identification of differences in resistance to chemo- and radio-therapy of pancreatic cells depending on stem-cell-like properties
Experimental and clinical studies:

• the search for the biomarkers
• investigation of the dynamics of biomarkers
• investigation of the cellular changes during the radiotherapy using model systems
EPIDEMIOLOGY GROUP

Objectives - to carry out high-quality, well-planned epidemiological studies, to apply molecular epidemiology methods and to contribute to the evaluation of environmental and genetic risk factors on human cancer

Current research topics:
• studies of cancer risk, genotoxic damage and oxidative stress among workers of some occupational groups
• evaluation of effectiveness of cancer treatment with Cf252 gamma-neutron source
• studies of cancer incidence, mortality, survival and cancer risk knowledge in Lithuania
The experiments are performed *in vivo* and *in vitro*:

- on spectroscopy of bioactive molecules, nanoparticles and photosensitizers
- on optical biopsy and imaging of cancerous and damaged tissues and cells
- on light interaction with biological objects, cells and tissue
- on *in vivo* application of novel technologies (Nanomedicine) for early cancer diagnostics and therapy
COLLABORATION WITH OTHER INSTITUTIONS

INSTITUTE OF IMMUNOLOGY, VILNIUS UNIVERSITY

THE INSTITUTE OF EXPERIMENTAL AND CLINICAL MEDICINE, VILNIUS UNIVERSITY

INSTITUTE OF BIOCHEMISTRY

VYTAUTAS MAGNUS UNIVERSITY DEPARTMENT OF BIOLOGY LABORATORY OF BIOPHYSICS

LABORATORY OF BIOMEDICAL PHYSICS

FACULTY OF CHEMISTRY, VILNIUS UNIVERSITY

FACULTY OF PHYSICS, VILNIUS UNIVERSITY

NATIONAL CENTRE OF PATHOLOGY

KAUNAS MEDICAL UNIVERSITY OPHTHALMOLOGIC CLINIC

KAUNAS MEDICAL UNIVERSITY INSTITUTE OF CARDIOLOGY
PROJECTS, PROGRAMMES, ISSUES SUPPORTED BY Research Council of Lithuania

- NOTCH signaling pathway expression total study in case of uterine body cancer, possible prognostic value (2011-2012).
- Individualization of therapeutic dendritic cell vaccine for oncology patients (2011-2012).
- The investigation of reducing cancer morbidity in Lithuania and Belorussia according to the model of oncourology (kidney, bladder, prostate cancer) (2011-2012).
• Researches of HPV, its types and quantity in cell in order to identify high-risk groups to get oral cavity, larynx and cervical pre cancer diseases and cancer (2010-2012).

• Gold nanoparticles - multifunction laser markers contrast imaging and therapeutic technologies as well as X-ray diagnosis of diagnostics (2012-2013).

• Bioinformatics analysis of aggregate research services (2012.08 – 2012.12)
EU projects (1)

• Improvement in early detection and combined treatment of oncological patients in Lithuania (2009-2012).
• Post-doc fellowships in Lithuania (2009-2012).
• Creation of oncological thematic network together with associations related to it (2010-2012).
• Training of IOVU specialists, who contribute to the reduction of morbidity and mortality from cancer diseases (2009-2014).
• Creation of United Life Sciences Center (2010-2014).
• Biotechnology and Biopharmacy: basic and applied researches (2012-2015).
EU projects (2)

• Education of Technology transfer skills in Lithuania valleys education and research institutions (2011-2014).
• Improvement of health services quality of skin and lung cancer diagnostics using IT technologies (2012-2014).
• Training development of highly qualified biomedical field professionals that fulfil needs of the state and society (2010-2014)
• National open access to scientific information archive (2011-2014)
• Development and renewal of infrastructure for biotechnology and biopharmaceutical professionals training and MTEP activities (2011-2013)
INTERNATIONAL RESEARCH PROJECTS

PUBLICATIONS 2012

Papers in ISI IF>10 (2009-2012) – 9

Papers in ISI Master Journal List – 41

Papers in international journals – 14
STUDENT SCIENTIFIC RESEARCH AND PRACTICE

PRACTICAL BASE FOR EDUCATION

TRAINING, MATERIALS, LABORATORY WORK

EDUCATION IOVU

SCIENCE

PHD, POST-DOC

CLINICS

CME

RESIDENCY
Institute of Oncology, Vilnius University (IOVU) – base for education of the students from different faculties of the Vilnius University

<table>
<thead>
<tr>
<th>LEVELS</th>
<th>VU FACULTIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-st level (students, bachelors)</td>
<td>Medicine Faculty, Nature Science Faculty, Physics Faculty, Chemistry Faculty and others</td>
</tr>
<tr>
<td>2-nd level (postgraduate students, residents)</td>
<td></td>
</tr>
<tr>
<td>3-rd level (Ph doctor)</td>
<td></td>
</tr>
</tbody>
</table>
"ASSOCIATION OF THE SOCIETIES WORKING IN THE FIELD OF ONCOLOGY"

Address – Santariškių g. 1
Institute of Oncology, Vilnius University

President Dr. S. R. Letautienė
IOVU

President Dr. G. Bulotienė
IOVU

President Dr. J. Dementavičienė
VUHSK

President Dr. (HP) N.E. Samalavičius
IOVU

President Habil. Dr. V. Ostapenko
IOVU

President Dr. E. Janulionis
IOVU

President Dr. (HP) S. Cicėnas
IOVU

President Dr. V. Atkočius
IOVU

President Dr. A. Ulys
IOVU

President Dr. E. Janulionis
IOVU
## FINANCIAL ACTIVITY (INCOME) 2011

<table>
<thead>
<tr>
<th>Income</th>
<th>Amount (in thousand Eur)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithuanian government budget</td>
<td>1166,2</td>
</tr>
<tr>
<td>Research Council of Lithuania</td>
<td>251,9</td>
</tr>
<tr>
<td>Customer’s funds (territorial health insurance fund and other)</td>
<td>16485,6</td>
</tr>
<tr>
<td>EU structural funds and Norwegian financial mechanisms</td>
<td>6906,0</td>
</tr>
<tr>
<td>Other</td>
<td>5892,9</td>
</tr>
<tr>
<td><strong>Total income</strong></td>
<td><strong>30702,6</strong></td>
</tr>
</tbody>
</table>
### MAIN PAST ACTIVITIES

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Description</th>
<th>Patients Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986-2000 CF-252</td>
<td>Intracavitary and interstitial brachytherapy</td>
<td>More than 2500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pts. treated</td>
</tr>
<tr>
<td>1995-2012</td>
<td>Photosensibilised tumour therapy</td>
<td>More than 1500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pts. treated</td>
</tr>
<tr>
<td>2000-2012</td>
<td>High frequency ultrasound, high frequency radioablation or crioablation therapy</td>
<td>More than 450</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pts. treated</td>
</tr>
</tbody>
</table>
MAIN RECENT ACTIVITIES I

- Cell technologies: mezenchymal stem cell research and cell therapy application to cancer patients treatment
- Investigation of various genes – oncogenes and genes tumor suppressors – expression in cancer patients (p53, ERCC, MMP, HPV etc.)
- Development of cryobiology (organs and tissues of cancer patients freezing before chemo- or radiotherapy)
- Hypofractionated radiotherapy (prostate, breast)
- Optical biopsy and Au quantum dots for diagnosis and therapy
- HIFU, RFA, CR of different tumours
- Long mononucleotides microsatellite markers for MSI in endometrial and other extracolonic tumours
MAIN RECENT ACTIVITIES II

• Immunomonitoring of cancer patients and search for prognostic and predictive immune parameters for individualized tumor immunotherapy. Final goal – translate this scientific knowledge into routine clinical practice

• Establishing a new facility for the state-of-the-art investigation, clinical application and optimization of therapeutic cancer vaccines

• Explorative and hypothesis driven investigations (using transcriptomics analysis by DNA microarrays) to elucidate the molecular mechanisms of the dynamics of cellular response to ionizing radiation and to predict response to treatment during radiotherapy.

• Investigation of metastasis process to elucidate biomarkers for the prognosis of the clinical case.
OUR FUTURE PRIORITIES

• To strengthen the correlation between fundamental and clinical studies
• To stimulate creative work and innovation of researchers
• To promote international collaboration
THANK YOU FOR YOUR ATTENTION