Thoracic Oncology (Lung Cancer)
Translational Center of Excellence

Overview

Clinical Director: Corey Langer, MD
Translational Director: Steven Albelda, MD
Project / Database Manager: Christiana Davis, MD
Recent Hires

• **Project/Database Manager,**
  – **Dr. Saman Ahmed,** hired August 1, 2014 was actively involved until May 2015, when she left Penn for Pulmonary Fellowship at Roswell Park.
  – **Dr. Christiana Davis,** her replacement started October 1, 2015.
    • Non-practicing MD with interests in medical communication, datasets, identifying trends and translating tumor data into improved outcomes for cancer patients.
    • Keeping tabs on all our projects
    • Previously worked on Program Projects at Penn.

• **Clinical Research Assistant,**
  – **Seth Jeffries,** hired June 20, 2016.
  – Responsibilities include obtaining informed consent, screening and enrolling patients for different study protocols centering on bio-correlatives in the field of thoracic immune-oncology, as well as other aspects of thoracic oncology.
  – Also assists with abstracting medical data from EMRs and entering abstracted data into databases
Major Areas of Focus

1. Translational lab-based studies to support clinical trials (CAR T cells and tumor microenvironment)
2. Clinical trials assessing immunotherapy in lung cancer
3. Databases to support lab-based studies and clinical trials and facilitate translational research
Translational Projects

• Analyze lung cancer tumor microenvironment
• Improve cancer detection during surgery
• Identify tumor-specific biomarkers to optimize selection of targeted therapies and to better predict response to therapy
• Delineate determinants of response to Checkpoint Inhibition
• Preclinical studies to determine if chimeric antigen receptor (CAR)-modified T cells function in lung cancer
• Preclinical studies to help overcome potential limitations of Adoptive T cell Transfer
# Investigator Initiated Trials

<table>
<thead>
<tr>
<th>Trial</th>
<th>Partner</th>
<th>Status</th>
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</table>
| **Project 1A. Phase 1 Ad.TK Pleural Effusion Clinical Trial**  
[Adenoviral vector encoding an immunogenic suicide gene injected intrapleurally] | Advantagene | - Opened 10/13  
- 22 screened/consented  
- 19 pts enrolled. Goal:  
- CRS in pt # 6  
- Celecoxib added to mitigate toxicity  
- 13 pts accrued since amendment  
- Optimal dose identified - No new safety issues  
- Accrual completed Spring ‘16 |
| **Project 1B. DNA Plasmid Vaccine Clinical Trial**  
[Novel cancer-specific, hTert DNA vaccine has been developed; studied alone and in conjunction with DNA for IL-12 to serve as an adjuvant therapy] | Inovio | - Opened 1/22/15  
- Resected NSCLC (IB-IIIA) pts  
- Screened to date: 18  
- # of active patients: 15  
(15 completed Tx) |
## Investigator Initiated Trials

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</table>
| **CAR-T Cells targeting Mesothelin for Lung Cancer and Mesothelioma** | Novartis   | - Opened Summer, 2016  
- Uses improved CAR targeted to mesothelin  
- NSCLC pts screened for mesothelin expression (increased likelihood with KRAS)  
- Phase 1 Trial- 3+3 design  
- If safe, groups will get pretreatment with cyclophosphamide  
- 3 MPM pts recruited to date |
| **Intra-tumoral Neoadjuvant Ad.TK for patients with high risk resectable lung cancer** | Advantagene | - To open Fall 2017  
- Intratumoral injection of Ad.TK in resectable patients  
- Tumor then resected and analyzed 2 weeks later  
- Phase 1 Trial- 3+3 design |
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| **UPCC 25514-MK3475 Merck:** Phase II Study of Pembrolizumab after Curative Intent Treatment for Oligometastatic Non-Small Cell Lung Cancer (PD-1) | Merck | • PI: Joshua Bauml  
• Allows up to 4 metastatic sites  
• Pembro given for up to 1 yr after definitive Tx of mets  
• 42 pt accrued to date  
• Target n – 40  
• Oral presentation at WCLC ‘17 |
| **Phase II trial of consolidation** pembrolizumab after concurrent chemotherapy and proton re-irradiation for thoracic recurrences of NSCLC | Merck | • PIs: Christine Martin Ciunci and Abigail Berman  
• Opened Summer, 2017 |
<table>
<thead>
<tr>
<th>Trial</th>
<th>N</th>
<th>Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPCC 06514-MK3475-021</td>
<td>20</td>
<td>Merck</td>
</tr>
<tr>
<td>Pembrolizumab in combination with chemotherapy or immunotherapy in patients with metastatic NSCLC (PD-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPCC 06513-M 3475-010</td>
<td>12</td>
<td>Merck</td>
</tr>
<tr>
<td>Randomized trial of two doses of MK-3475 versus Docetaxel in previously treated subjects with NSCLC (PD-1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPCC 13514- Phase I/II Study of Pembrolizumab in combination with INCB024360 for Recurrent/Metastatic NSCLC or H&amp;N</td>
<td>4</td>
<td>Incyte</td>
</tr>
<tr>
<td>UPCC 45914-Celgene-BMS-936558: Phase 1, Open-Label, Multicenter, Safety Study of Nivolumab (BMS-936558) in Combination with nab-Paclitaxel / Carboplatin in Stage IIIB/IV Non-Small Cell Lung Cancer</td>
<td>3</td>
<td>Celgene</td>
</tr>
<tr>
<td>UPCC 02516 – Stemcentrx: Rova T</td>
<td>4</td>
<td>Stemcentrx</td>
</tr>
<tr>
<td>Open-label, Single-Arm, Phase 2 Study Evaluating Efficacy, Safety and Pharmacokinetics of Rovalpituzumab Tesirine (SC16LD6.5) for Third-line and Later Treatment of Relapsed or Refractory Delta-Like Protein 3-Expressing Small Cell Lung Cancer (TRINITY)</td>
<td></td>
<td></td>
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## Thoracic Oncology: Comparative Volumes FY 2013 and 2014 and 2015 and 2016

<table>
<thead>
<tr>
<th>Period</th>
<th>FY 2013</th>
<th>FY2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>% Increase*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Volume (unique pts)</td>
<td>2544</td>
<td>2908</td>
<td>3289</td>
<td>3549</td>
<td>39.5%</td>
</tr>
<tr>
<td>Total Volume Heme/Onc (PCAM and Presby)</td>
<td>1130</td>
<td>1271</td>
<td>1377</td>
<td>1490</td>
<td>31.8%</td>
</tr>
<tr>
<td>Total Volume Rad Onc (PCAM, Valley Forge)</td>
<td>491</td>
<td>593</td>
<td>753</td>
<td>846</td>
<td>72.3%</td>
</tr>
<tr>
<td>Total Volume Thoracic Surg (PCAM, CCH, PAH, Presby)</td>
<td>411</td>
<td>456</td>
<td>469</td>
<td>506</td>
<td>23.1%</td>
</tr>
<tr>
<td>Total Volume Pulmonary (PCAM)</td>
<td>512</td>
<td>588</td>
<td>690</td>
<td>707</td>
<td>38.1%</td>
</tr>
</tbody>
</table>

* % Increase: from 2013
Metrics of Success (2)

Thoracic Oncology Protocol Accrual:

Therapeutic enrollment=181

Non-Therapeutic enrollment= 279

Accruals Thoracic Trials:

<table>
<thead>
<tr>
<th>UPCC#</th>
<th>Trial</th>
<th>Accrual</th>
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<tbody>
<tr>
<td>25508</td>
<td>Trimodality</td>
<td>30</td>
</tr>
<tr>
<td>12512</td>
<td>Lung CTC</td>
<td>195</td>
</tr>
<tr>
<td>02515</td>
<td>Diagnostic CTC</td>
<td>76</td>
</tr>
<tr>
<td>28514</td>
<td>Flaxseed</td>
<td>26</td>
</tr>
<tr>
<td>15415</td>
<td>Gut microbiota</td>
<td>10</td>
</tr>
<tr>
<td>40914</td>
<td>RadVax- lung cohort</td>
<td>10</td>
</tr>
<tr>
<td>01516</td>
<td>NJ Pembro</td>
<td>1</td>
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<tr>
<td>NRG1308</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>
Thoracic TCE: Goals

• Publish and Disseminate Results of IITs and Industry Collaborations
• Expand our breadth of IO/IO combinations
• Complete vital Biocorrelative efforts with IOs, alone and in combination
• Expand Database initiatives
• Become self-sustaining (financially, scientifically)
  – Grants
  – Philanthropy
  – Staffing and Infrastructure
• Serve the needs of our Patients and the Careers of our Staff
A Multi-investigator, Multidisciplinary Team

Pathology
Albelda, Haas, Thompson, Moon, Vachani, Lanfranco

Lab Medicine
Deshpande, Litzky, Zhang, Feldman, Roth, Plesa, Watt

Pulmonary
Langer, Cohen, Evans, Aggarwal, Baum, Alley, Ciunci, Kosteva, Marmarelis, Carpenter, Davis, Jeffries

Hematology

Oncology
Singhal, Kucharczuk, Pechet, Jarrar, Predina

Thoracic Surgery
Feigenberg, Berman, Simone, Levin, Glatstein, Chen

Radiation Oncology

Biostatistics

Epidemiology
Hwang, Mick

Center for Personalized Diagnostics (CPD)
Morrissette, Velu, Hess, Sussman

Radiology
Katz, Gefter, Kolansky

Basic Science
Eruslanov, Wherry, Huang, June, Hancock, Linette, Beatty, Melenorst, Weiner

Abramson Cancer Center
Penn Medicine