Integrating Science to Health

Laboratory Research
- ~110 faculty, ~350 postdocs
- 737 publications in 2009
- $97.2 million in grants

Clinical Research
- 214,509 outpatient visits
- 2,754 inpatient admissions
- 402 active clinical trials

Michael A. Dyer, Ph.D.
Integrating Science to Health

Education and Outreach

• All discoveries and data made freely available to public
• Results from clinical trials become standard of care around the world
• Educate public about childhood cancer

Michael A. Dyer PhD  SDB Education Symposium August 6. 2010 Albuquerque, NM
Retinoblastoma is the 3rd Most Common Form of Cancer in Infants

- ~5,000 cases/year Worldwide
- 100% Fatal if Untreated
- 10% Survival for Metastatic RBL
- Developmental Tumor
- First Tumor Suppressor Gene

“...within fifteen years, at the outside, we’ll be able to stop retinoblastoma before it begins. I’m so sure of that that I’ve already given the drug a name. I call it retino-revert.”

Dr. David Abramson, 1986
24 years Later: Bridging the Gap Between Clinical & Laboratory Research

CLINICAL RESEARCH
- radiation
- chemotherapy
- surgery
- focal therapy

LABORATORY RESEARCH
- 2-hit hypothesis
- 1st tumor suppressor
- knockout mice
- pathway analysis

Dr. Matthew Wilson
RB1 Gene Inactivation Leads to Retinoblastoma in Humans but not Mice
The First Knockout Mouse Model of Retinoblastoma

2004: Zhang et al. The First Knockout Mouse Model of Retinoblastoma. *(Cell Cycle)*

2004: MacPherson et al. Cell Type Specific Effect of Rb Deletion in the Murine Retina. *(Genes & Development)*

2004: Chen et al. Cell Specific Effects of Rb or Rb/p107 Loss On Retinal Development. *(Cancer Cell)*

2006: Donovan et al. Compensation By Tumor Suppressor Genes During Retinal Development. *(BMC Biology)*
Retinoblastoma Preclinical Trial with 212 Mice Enrolled to Date on 3 Trials
TPT/CBP Response in Humans and Mice

Representative example from ongoing study: DSMB Approved 11/17/09
Chemical Biology
Drs. Kip Guy, Anang Shelat, David Smithson, Fangyi Zhu, Ying Shen

Structural Biology
Drs. Brenda Schulman, Don Bashford, Tony Ferreira and Richard Kriwacki
Dr. Wuyuan Lu

Pharmacology and Toxicity
Drs. Clinton Stewart and Michael Tagen
Dr. Henry Edelhauser

Pathology and Toxicity
Drs. David Ellison and Matt Wilson

Diagnostic Imaging
Drs. Robert Ogg and Beth McCarville

Neurobiology and Cancer Biology
Dr. Dianna Johnson
Drs. Connie Cepko, Karen Vousden, Aart Jochemsen

Patient Care and Clinical Trials
Drs. Matthew Wilson, Carlos Rodriguez-Galindo, Barrett Haik
Dr. David Abramson
Grant System Leads Cancer Researchers to Play it it Safe

“The cancer institute has spent $105 billion since President Nixon declared war on the disease in 1971.

Yet the fight against cancer is going slower than most had hoped.”

We need to build interdisciplinary teams made up of doctors and researchers to efficiently translate research discoveries into new treatments for childhood cancer.
St. Jude Cancer Education Outreach Program ("Cure4Kids for Kids")

- Started in 2006 as part of Comprehensive Cancer Center outreach initiative
- Housed in International Outreach Program
- School-based education program
- Educate students, parents, teachers about:
  - Cancer and dispel misconceptions
  - Healthy living practices to reduce the risk of cancer in adulthood
  - Inspire science and health-related careers
Accomplishments

• 1,800 students
• 150 teachers
• 20+ St. Jude departments
• 3 experts developed children’s books
Format

• St. Jude experts visit local schools
• Give interactive, engaging presentations
• Lead hands-on, discovery-based activities
Career Talks at Local Schools

• Highlight Careers
  – Clinical care
  – Basic science
  – Computing
  – Administration
  – Writing
  – Etc.
Career and Research Day

• Hosted in conjunction with St. Jude Postdoctoral Association
• 20 students and 2 teachers from local high schools visit campus
  – “Career tour”
  – Mentoring luncheon
  – Hands-on lab experiment in GFP genotyping and electrophoresis
Teacher Training

- Three events in 2 years for local teachers
- St. Jude doctors, scientists, teachers participated as presenters
- Website with teacher resources

Cure4Kids for Kids Teacher Summit April 2010
Educational Website

- Electronic access to education materials
- (eg. books, glossary, etc.)
- Extends classroom, increases access and reach
- “Experts” section profiling experts and careers
- www.Cure4Kids.org/kids
Integrating Science to Health

- synaptogenesis
- stem/iPS cells & reprogramming
- drug discovery
- translational research
- developmental neurobiology
- evolutionary biology
Pharmacokinetics of an Ocular Formulation of Nutlin-3a

oral (200 mg/kg)
subconjunctival (25 mM)

Ocular Formulation of Nutlin-3a
15% polyethylene glycol
10% propylene glycol
5% Cremophor EL in PBS
Identification and Characterization of the First MDMX Inhibitor

Damon Reed, Ying Shen and Kip Guy