

 *SIU School of Medicine*

# ARL-1 Antibody and ARL-1 Marker

- **ARL-1 Specific Antibodies**
  - Novel highly specific antibody for AKR1B10
  - Screening for at-risk populations
  - Early diagnosis applications
- Southern Illinois University School of Medicine
- Kristy Owen  
Technology Transfer Specialist
- October 8, 2010



# Technology Summary

- Novel, highly specific antibody developed by:
  - Deliang Cao, MD, PhD, Associate Professor  
Medical Microbiology, Immunology & Cell Biology  
SIU School of Medicine
- Binds to AKR1B10 (ARL-1) protein
  - Small antigen, highly specific
  - No cross-reactivity with other proteins in  
aldo-keto reductase (AKR) superfamily
- Licensing opportunities for research  
and clinical applications



# Technology Details

- ARL-1 reduces toxic carbonyls in the body
  - Aldehydes/ketones
  - Carcinogens from foods
  - Medications, anti-cancer drugs



Highly Toxic

Non-Toxic



# Technology Details

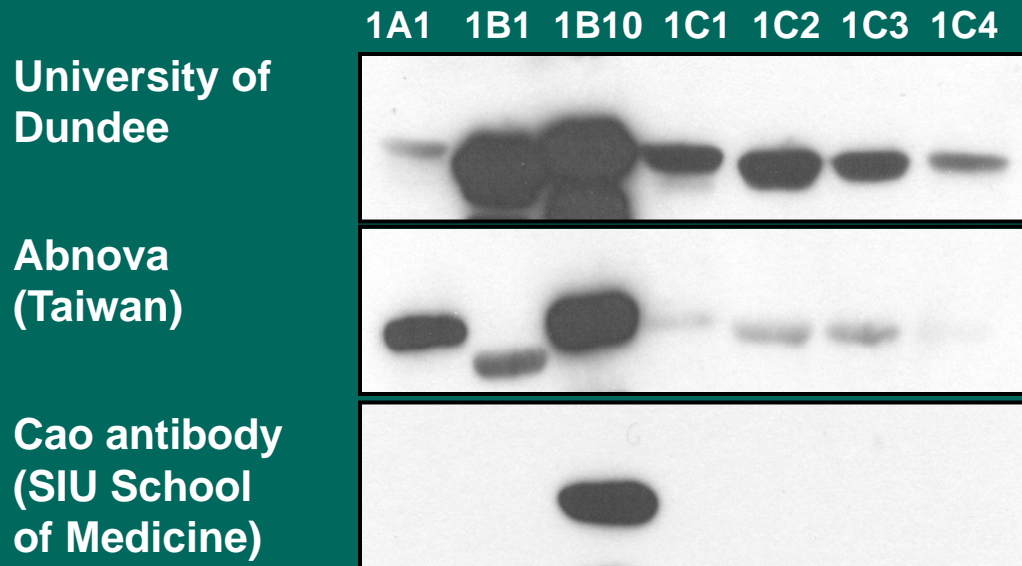
- ARL-1 expression profile

Type of Tissue	Colon/Rectum	Breast	Prostate	Liver	Lung
Normal expression	High	Low/Absent	Low/Absent	Low/Absent	Low/Absent
Cancer expression	Low/Absent	Over	Over	Over	Over

- Protein can be detected in bodily fluids with antibody or other methods
  - Serum (blood)
  - Urine
  - Stool

# Technology Details

- ARL-1 antibody specificity comparison
  - 1:1000 dilution, primary polyclonal antibodies



- Specificity helps avoid incorrect results (AR expression is inverse of ARL-1)

# The Competition

- Cancer Biomarkers
  - Breast: no reliable serum biomarkers
  - Prostate: PSA (prostate-specific antigen)
  - Colon: no reliable biomarkers
  - Liver: AFP ( $\alpha$ -fetoprotein, false positive/negative)
  - Lung: no reliable biomarkers
- Antibodies
  - Several on the market
  - None as specific as Cao's antibody  
(won't bind to other related AKR proteins)

# Current Developmental Status

- Progress to date
  - *in vitro* data collected for many techniques (WB, ELISA, etc.)- *in vivo* studies planned
  - Specificity of polyclonal antibody confirmed
  - Clinical data collected to construct expression profiles and background data
  - Additional clinical data being collected and analyzed for biomarker applications
- Developmental hurdles
  - Preclinical data/expression profiling
  - Clinical trials funding/patient populations



# Technology Market

- Estimated new cancer cases in the US (2010)

Colorectal	Breast	Prostate	Liver	Lung
142,570	209,060	217,730	24,120	222,520

Total cases: 816,000

- Estimated cancer deaths in the US (2010)

Colorectal	Breast	Prostate	Liver	Lung
51,370	40,230	32,050	18,910	157,300

Total deaths: 299,860 (36.7%)



# Technology Opportunities

- Research
  - Useful cancer research reagent
  - Monoclonal or polyclonal antibodies
  - Antibody useful for:
    - Western Blot
    - ELISA
    - Immunoprecipitation
    - Immunofluorescence
    - Immunocytochemistry
    - Immunohistochemistry (frozen & paraffin)

# Technology Opportunities (cont.)

- Screening
  - Monitor protein expression levels and correlate with disease progression
  - Target at risk populations and those with family history of disease
- Diagnosis
  - Analyze protein in a specimen to make a cancer/precancerous diagnosis
  - Novel sandwich assay in development for breast cancer using serum samples

# Intellectual Property Protection

- Patent Protection
  - US Patent Application #12/032,327
    - Utility application
    - Filed 2/15/2008 (earliest priority 2/14/2007)
  - US Patent Application
    - Utility application, continuation-in-part
    - To be filed (priority from #12/032,327)
  - US Patent Application #12/739,371
    - Utility application
    - Filed 4/22/2010 (earliest priority 10/25/2007)



# Intellectual Property Protection

- Claim Coverage
  - Antibody
    - Highly specific antibody produced from short 15 amino acid sequence
    - Monoclonal and polyclonal antibodies
  - Clinical Use
    - Screening and diagnostic methods
    - Various cancers  
(colorectal, breast, prostate, liver, lung)

# ARL-1 Antibodies

- For more information:
  - Stop by the display table
  - Visit our web site:
    - [www.siumed.edu/adrfa/techtransfer.html](http://www.siumed.edu/adrfa/techtransfer.html)
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- Any questions?

