



# *Project BASTION „From Basic to Translational Research in Oncology”*

## **Creation and coordinating the Bioinformatics/System Modelling Group**

**Radoslaw Zagozdzon MD PhD**



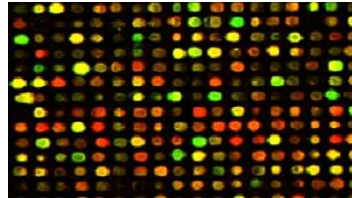
# Professional background

- MD and PhD at Medical University of Warsaw – cancer immunology
- 8 years in BIDMC, Boston, USA – molecular biology of cancer
- 4 years UCD, Dublin, Ireland – cancer biomarkers, in vivo cancer models

# Bioinformatic support for BASTION activities

- Organizing and coordinating the research group (2 postdocs, 2 IT specialists)
- Generating computer cluster and data storage
- Support for:
  - Next-generation sequencing
  - Databases (transcriptomic, proteomic and clinical data)

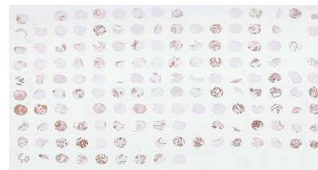
# Biomarker Validation



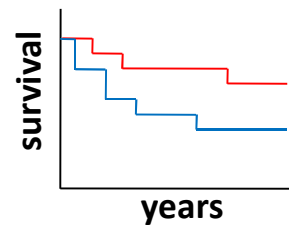
1. Biomarker discovery using various microarray datasets



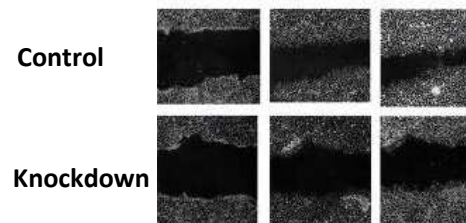
2. Biomarker specificity assessment & optimisation



3. Biomarker assessed on TMA/RPPA



4. Biomarker validation

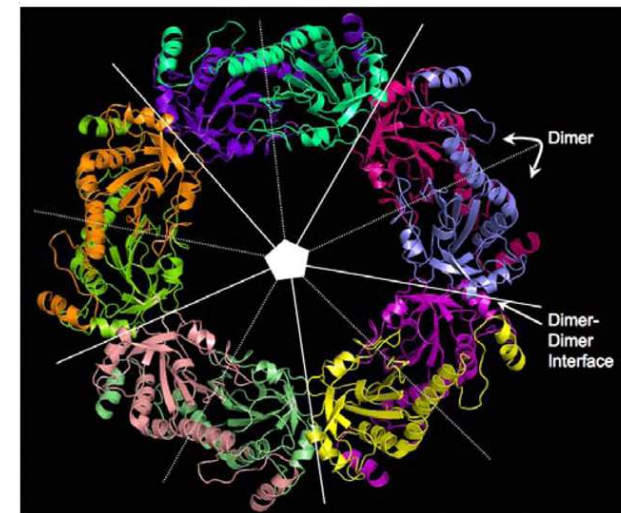
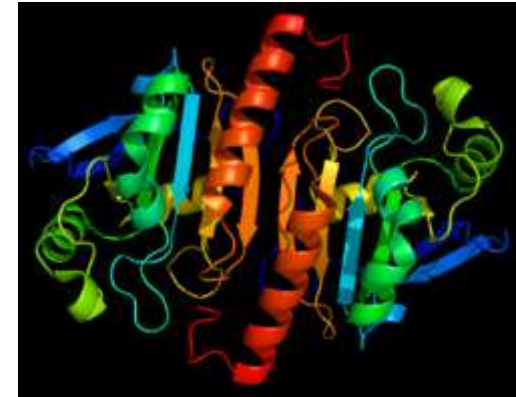


5. Utilise *in vitro* assays

Cell lines with modulated gene expression

# Peroxiredoxin-1 (PRDX1)

- Hs578T cell lines
  - Parental
  - Invasive clone (-i8) – decreased expression of PRDX1
- Peroxiredoxin family of antioxidant enzymes
- Multifunctional
  - Scavenger of hydrogen peroxide (dimer and decamer)
  - Chaperone of signal-transducing molecules (decamer)
  - Regulator of transcription
  - Ligand for toll-like receptor 4 (TLR4)
- Differentially expressed in prostate, lung & ovarian carcinoma.
- Contradicting results in breast cancer

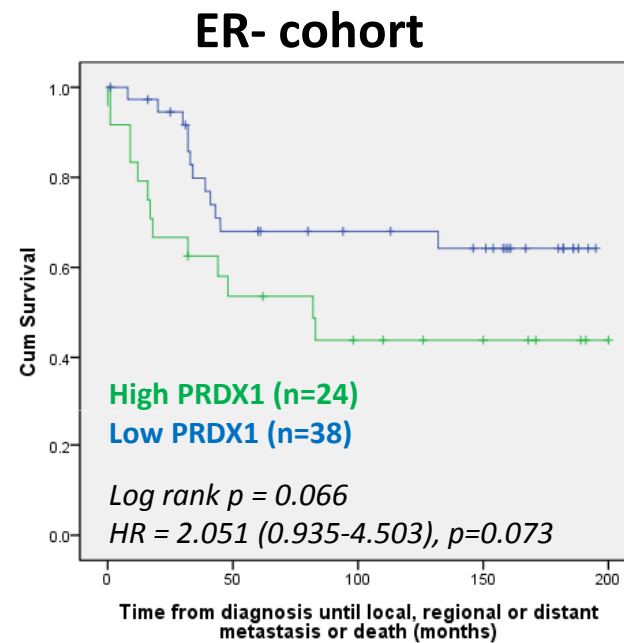
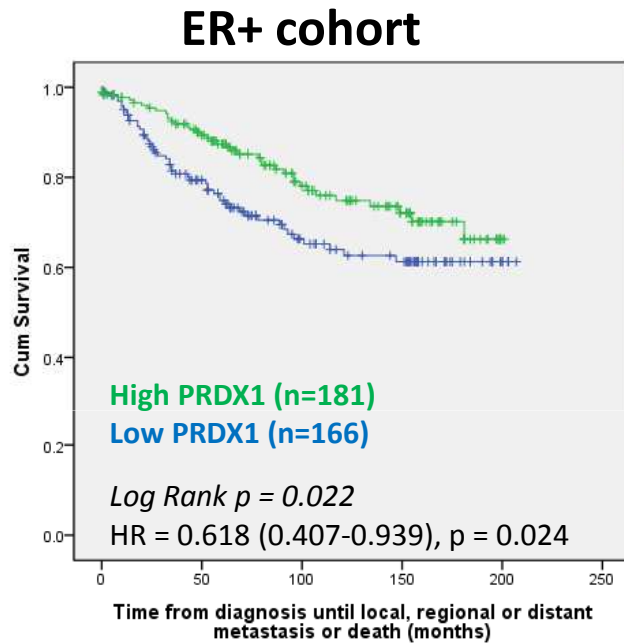


## Summary of Patient Cohorts

Cohort	Platform	Patient number	Protein	Clinico-pathological data	Survival	Gene Expression
Consecutive array	TMA	512	Yes (PRDX1)	Yes	Yes	No
Houston RPPA	RPPA	712	Yes (PRDX1)	Yes	Yes	No
The Cancer Genome Atlas – Breast cancer cohort	RPPA	410	~150 antibodies	Yes	Short follow-up	Yes

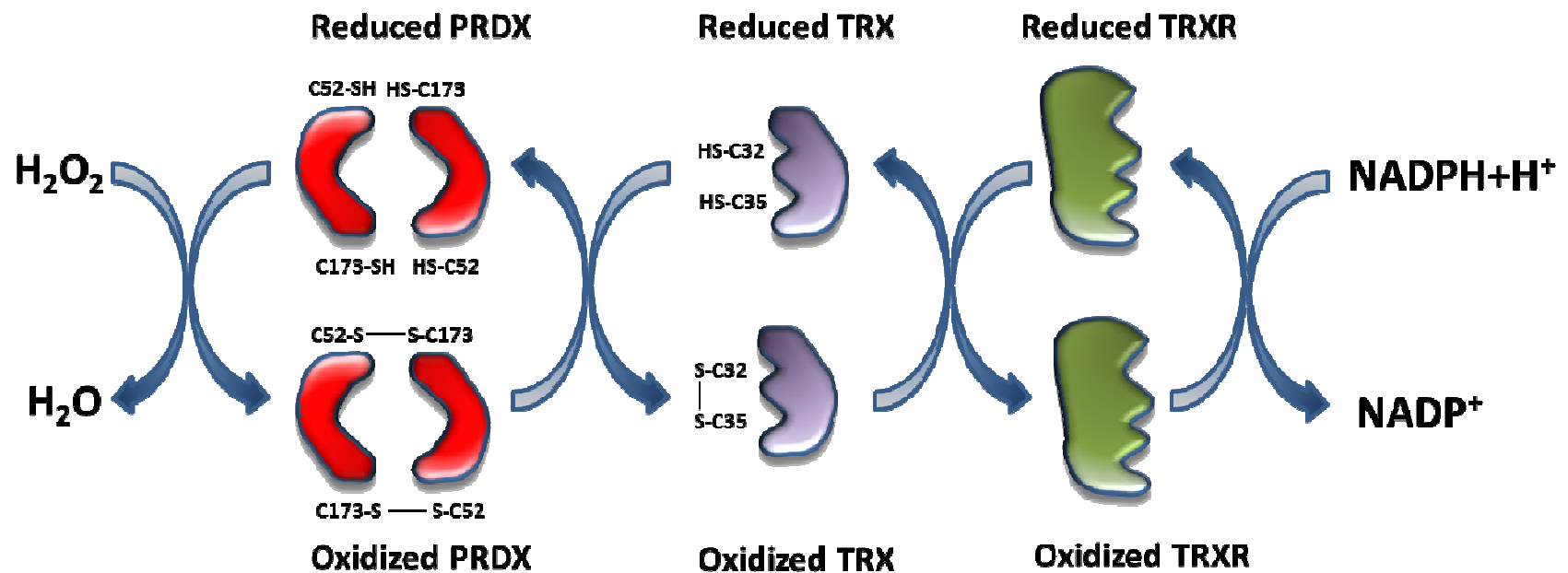
# PRDX1 & it's prognostic impact in ER-positive patients

CONSECUTIVE  
TISSUE MICROARRAY



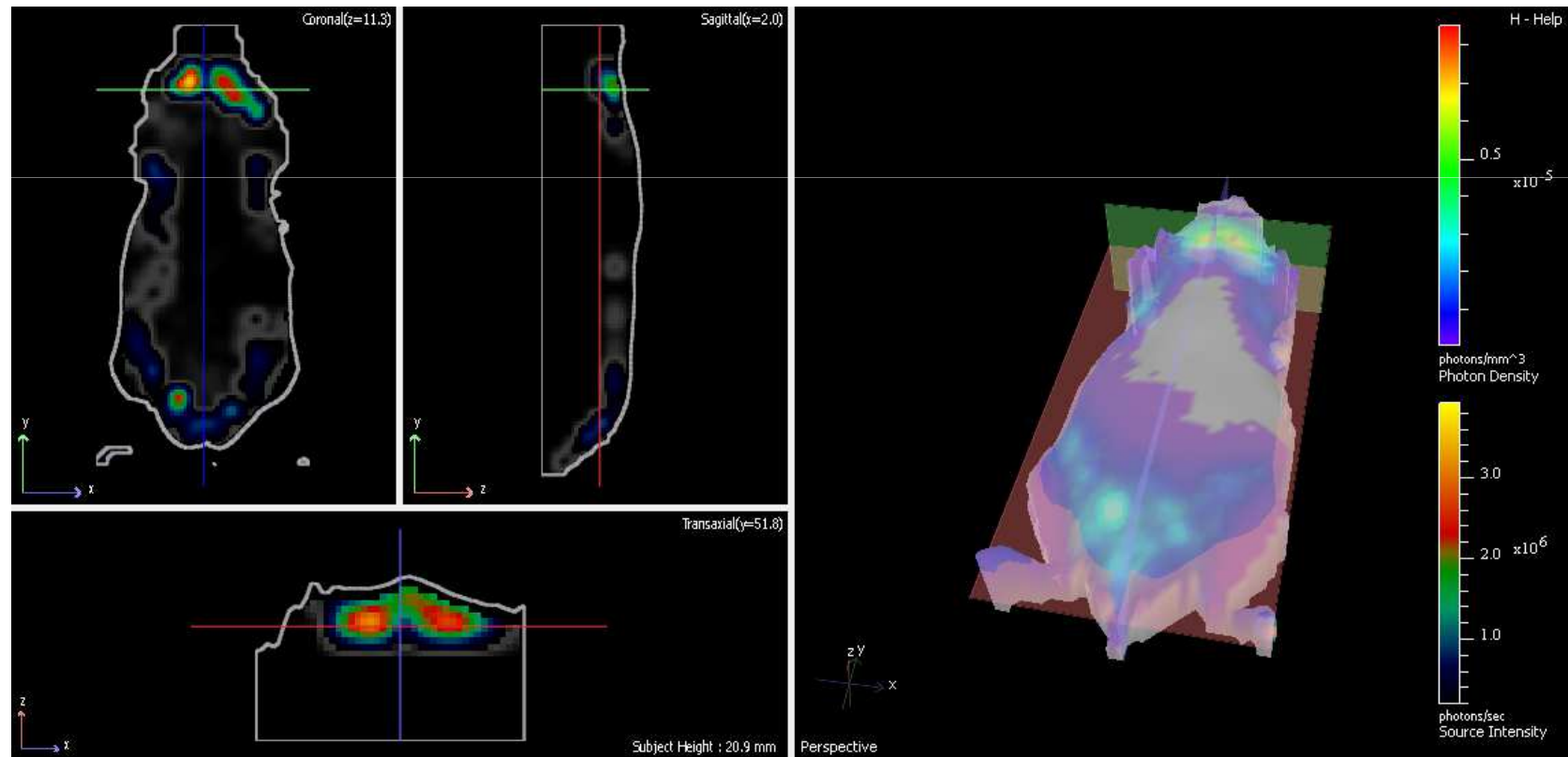
- Median split
- Prognostic value of PRDX1 in estrogen receptor positive (ER+) patients
- In vitro studies have shown that PRDX1 acts as a protector of ER receptor under oxidative stress

# Molecular Biology Studies





# In vivo models





**Thank you**