About OMICS Group

OMICS Group International is an amalgamation of Open Access publications and worldwide international science conferences and events. Established in the year 2007 with the sole aim of making the information on Sciences and technology 'Open Access', OMICS Group publishes 400 online open access scholarly journals in all aspects of Science, Engineering, Management and Technology journals. OMICS Group has been instrumental in taking the knowledge on Science & technology to the doorsteps of ordinary men and women. Research Scholars, Students, Libraries, Educational Institutions, Research centers and the industry are main stakeholders that benefitted greatly from this knowledge dissemination. OMICS Group also organizes 300 International conferences annually across the globe, where knowledge transfer takes place through debates, round table discussions, poster presentations, workshops, symposia and exhibitions.

About OMICS Group Conferences

OMICS Group International is a pioneer and leading science event organizer, which publishes around 400 open access journals and conducts over 300 Medical, Clinical, Engineering, Life Sciences, Pharma scientific conferences all over the globe annually with the support of more than 1000 scientific associations and 30,000 editorial board members and 3.5 million followers to its credit.

OMICS Group has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Omaha, Orlando, Raleigh, Santa Clara, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.

YEDITEPE UNIVERSITY
GENETICS AND BIOENGINEERING DEPT.



Assist. Prof. Dr. Hüseyin Çimen

huseyin.cimen@yeditepe.edu.tr

YEDITEPE PROTEOMICS and MASS SPECTROMETRY LABORATORY



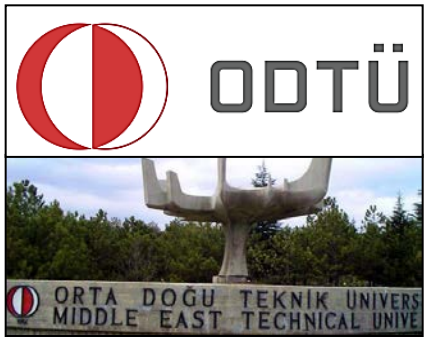


Yeditepe University

ISTANBUL, TURKIYE

OMICS Aug 4th,2014

About me…



Undergraduate (BSc): 2006
Molecular Biology and Genetics
Middle East Technical University, TURKEY

Graduate (PhD): 2012
Biochemistry, Microbiology and Molecular Biology (BMMB)
Eberly College of Science,
Pennsylvania State University, PA





Research: 2011 - 2012
Biochemistry
John C. Edwards Medicine School
Marshall University, WV



YEDITEPE UNIVERSITY
STEM CELL AND GENE THERAPY EXCELLENCE CENTER

Molecular Biology ve Genetics Lab

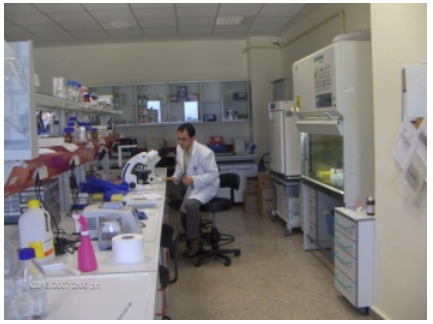




Mol. Diagnostic Lab



Nanobiotechnology Lab



Microbial Genetics Lab



Bioinformatics Lab



Functional Genetics Lab



Imaging Lab





Plant Biotechnology Lab



Biomaterials Lab



Protemics Lab

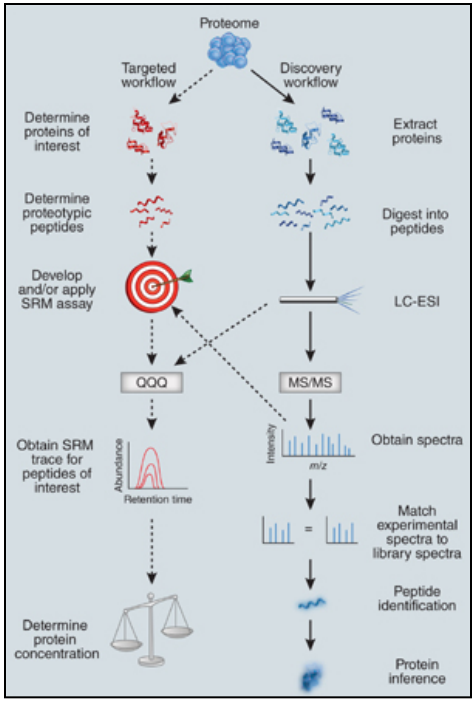




YEDITEPE PROTEOMICS and MASS SPECTROMETRY LABORATORY

Discovery-based Targeted Proteomic Studies:

Gel-based and/or off-gel protein sample preparation and purification



Allison Doerr, *Nature Methods* 10 (2013)

nano-HPLC



Thermo Dionex UltiMate 3000

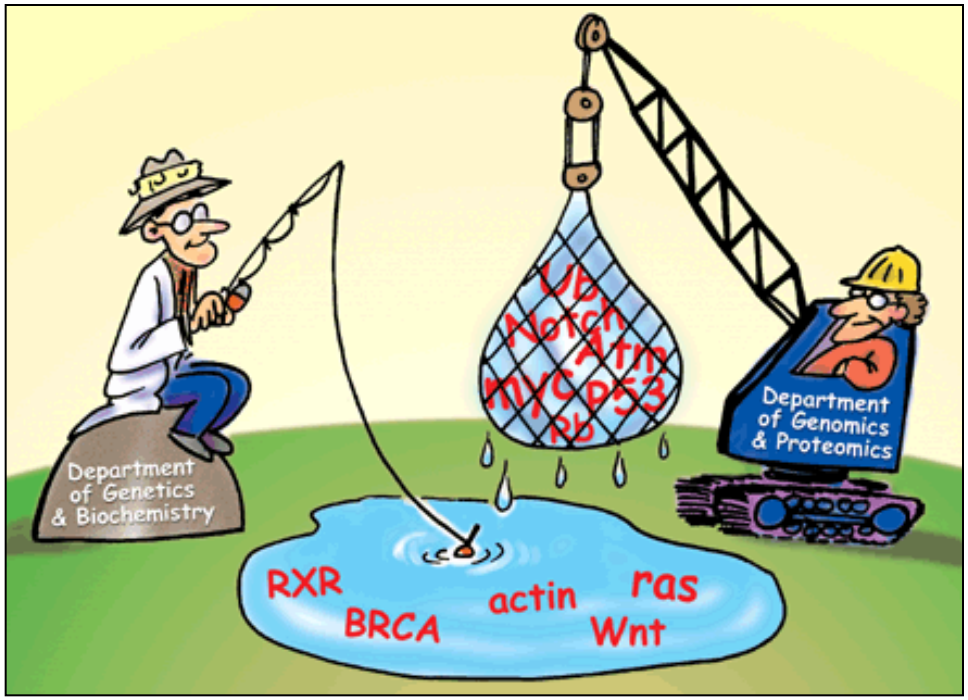
nanoESI-qTOF



Bruker Compact

- **Protein ID**
- **Protein structure, function, folding and interaction analysis**
- **Post-translational modification (PTM; acetylation) analysis of complex biological samples**
- **Biomarker discovery and characterization**

Biochemistry → Proteomics → Targeted Proteomics



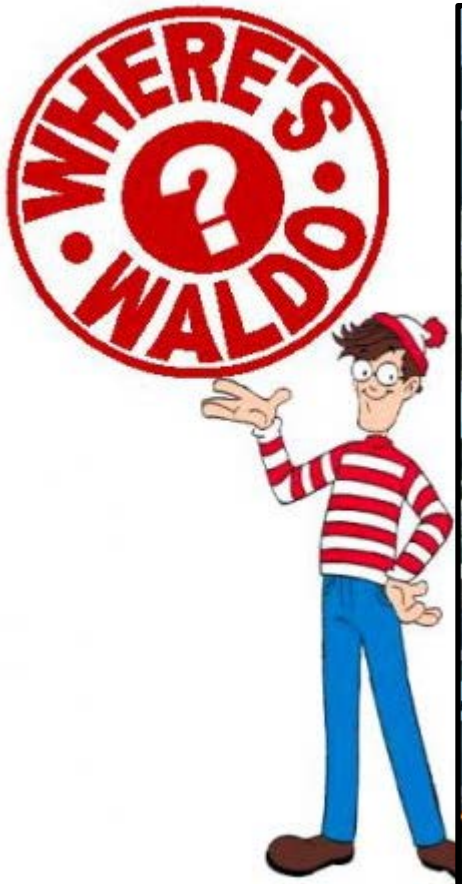
Stanley Fields, *Science* 291 (2001)



Katie Vicari,, *Nature Methods* 10 (2012)

Reproducible - Quantitative
Highly Sensitive Protein ID and Biomarker Discovery

Where is Waldo?

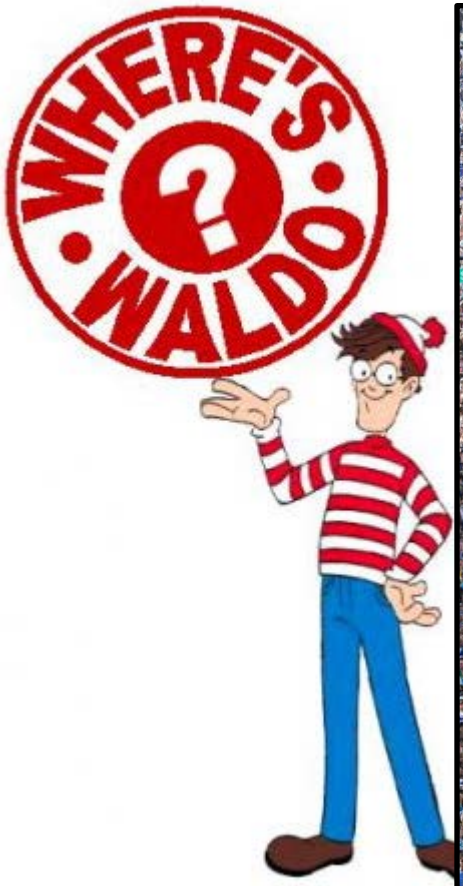




Vancouver Canucks Fan Zone, 2011

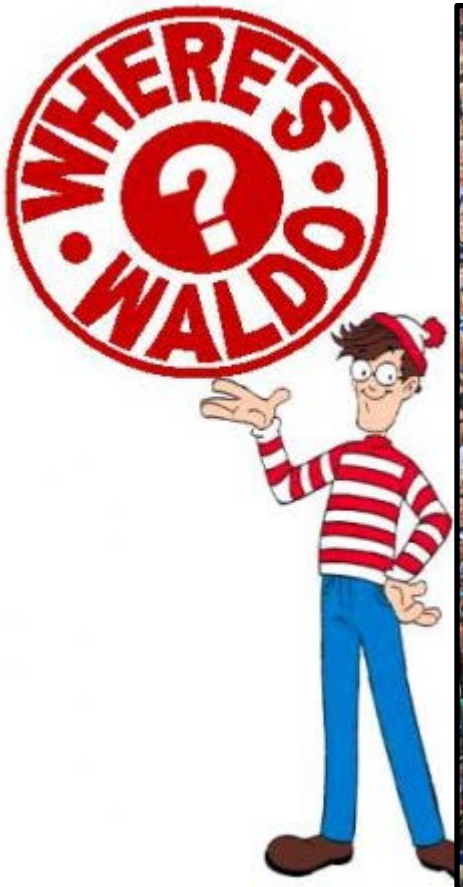
http://www.gigapixel.com/image/gigapan-canucks-g7.html

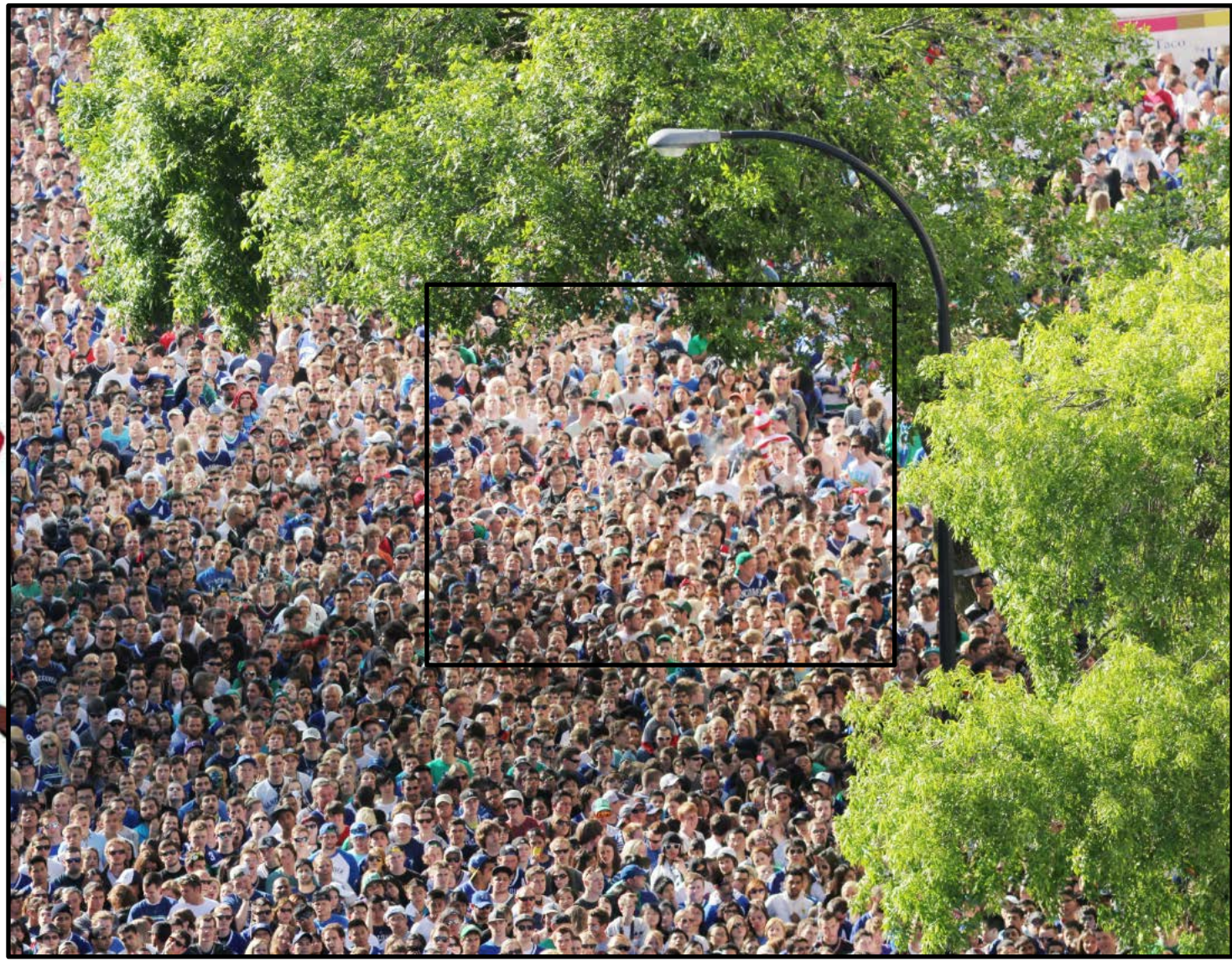
Where is Waldo?



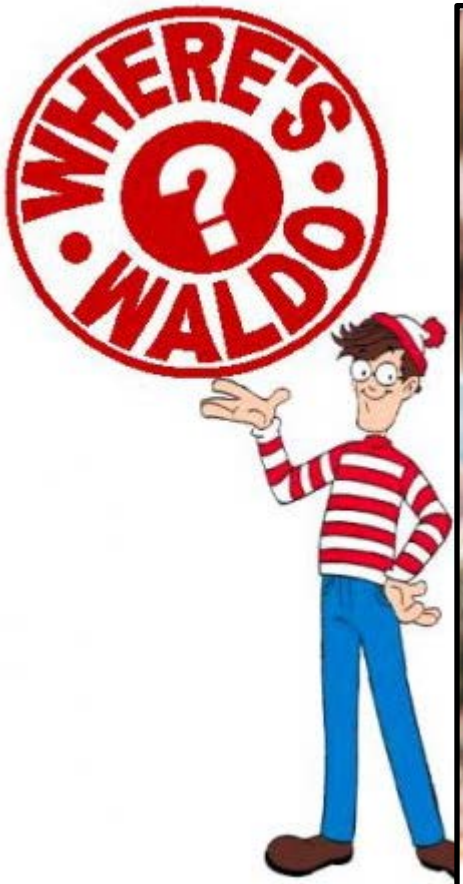


Where is Waldo?

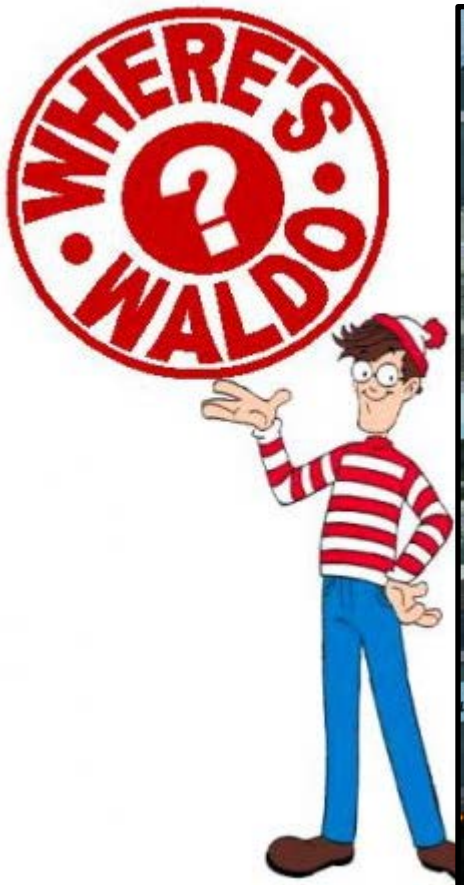




Where is Waldo?







HERE?

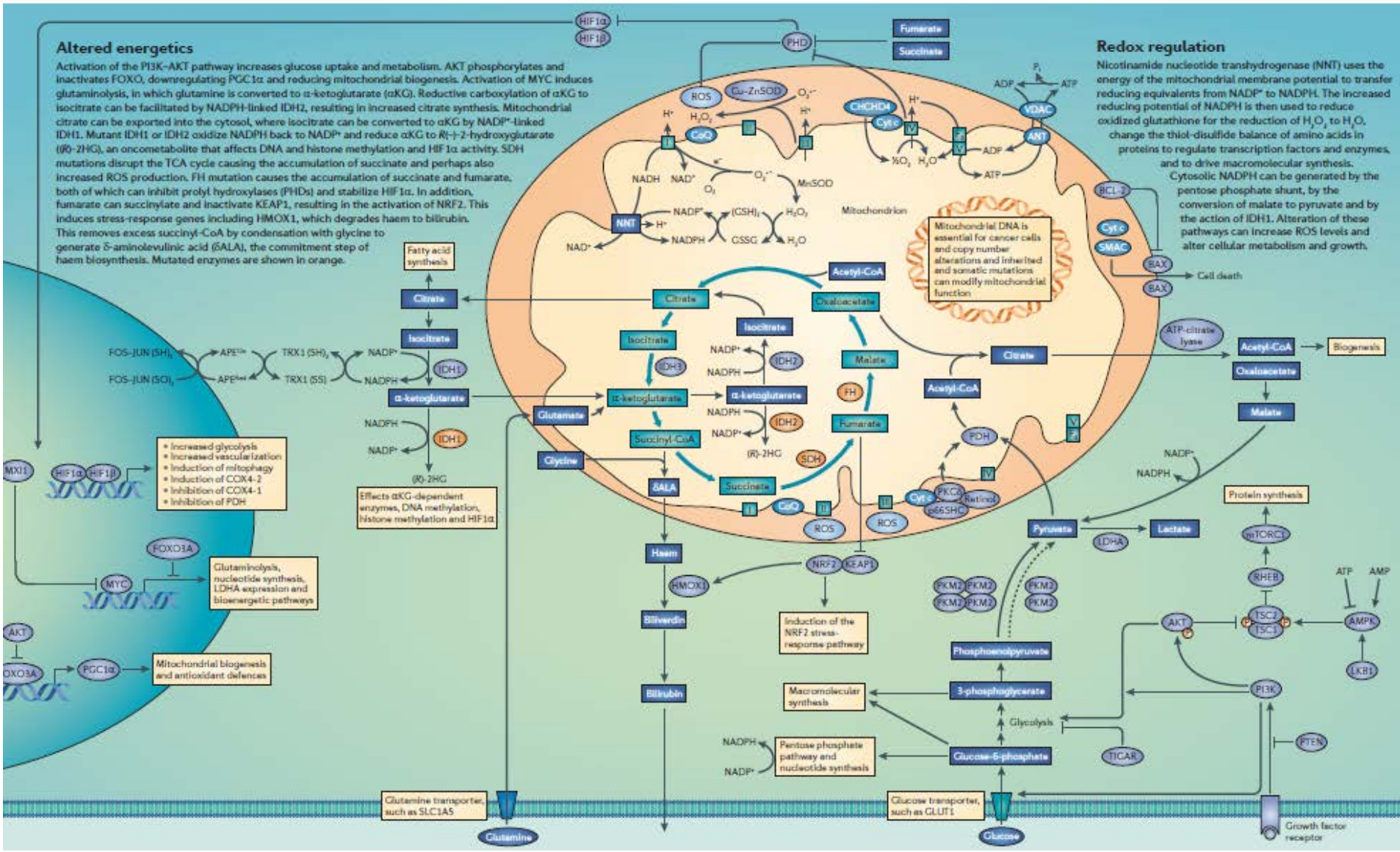


Vancouver Canucks Fan Zone, 2011

http://www.gigapixel.com/image/gigapan-canucks-g7.html

Mitochondrial functions and cancer:

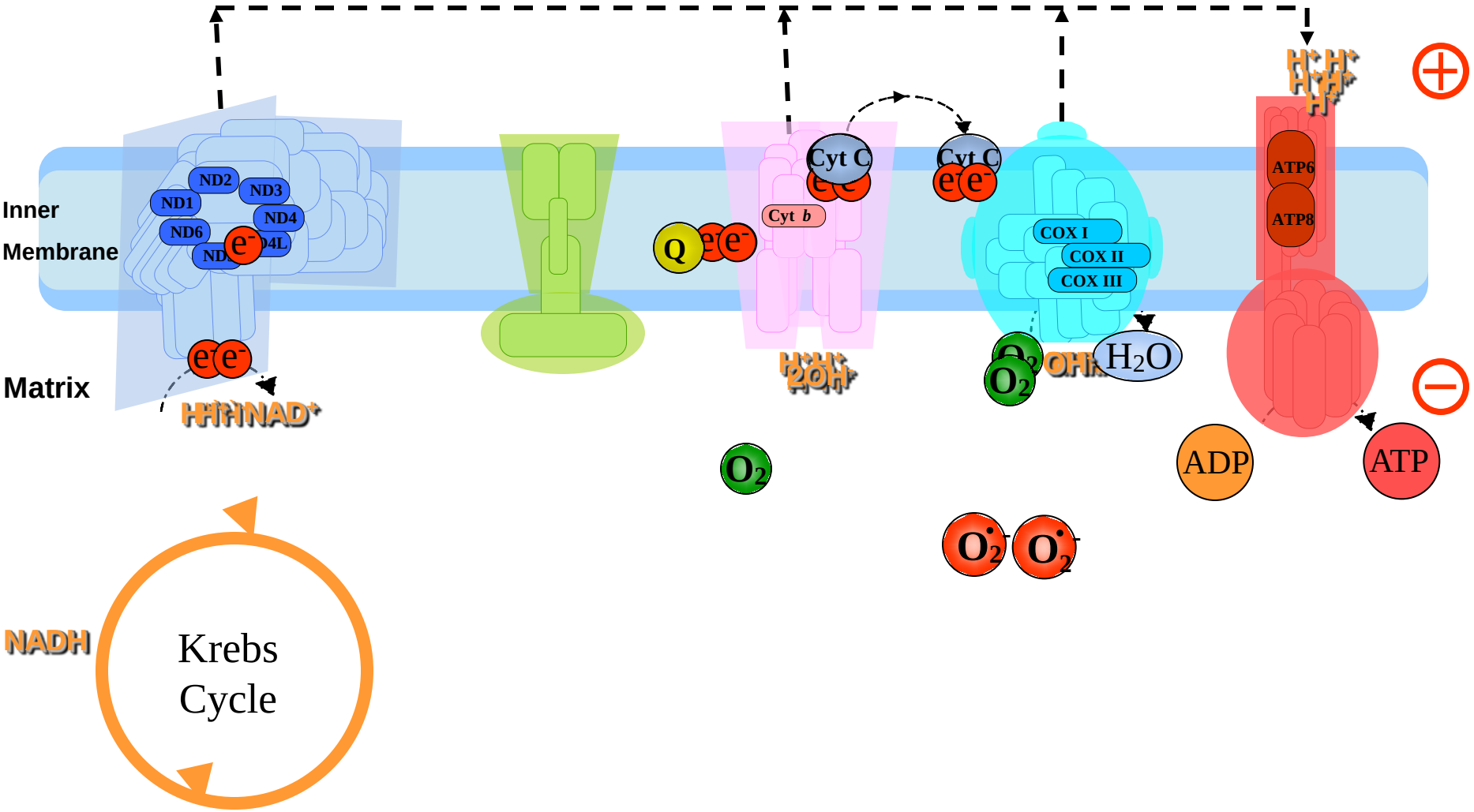
Elevated glycolytic metabolism and oxygen use in cancer cells



Douglas C. Wallace, Nature Reviews Cancer

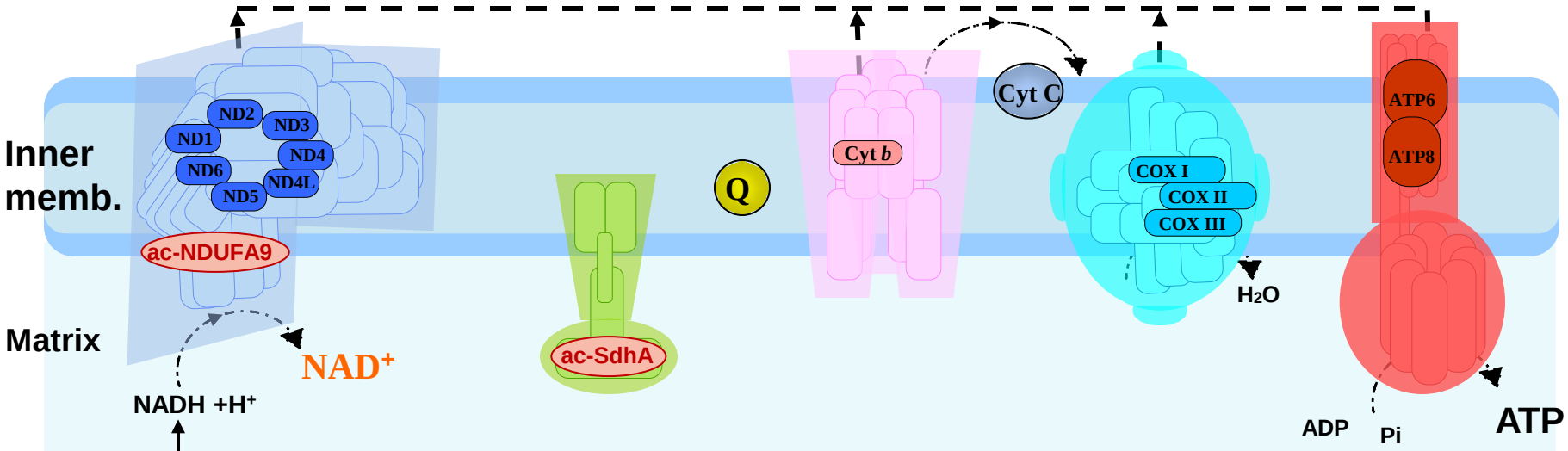
Electron Transport Chain

COMPLEX	I	II	III	IV	V
nDNA	39	4	10	10	16
mtDNA	7	0	1	3	2

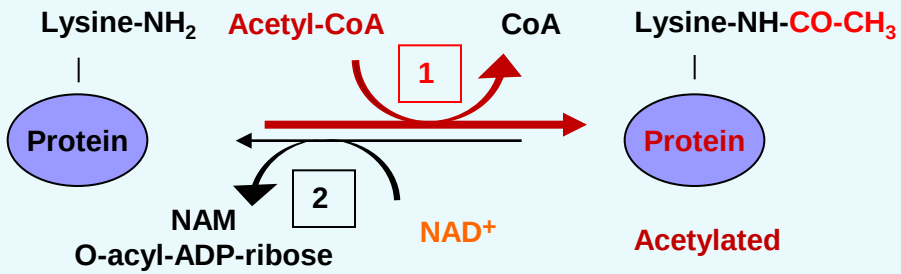


Peter S. Rabinwitch after Mandavilli et al, Mutation Research 509 (2002) 127–151

Regulation of Oxidative Phosphorylation Comlexes



Mitochondrial Proteome: >20 % acetylation (Kim SC et.al 2006)



1 GCN5L1

2 SIRT3, SIRT4, and SIRT5

Cimen H et al. (2010), Ahn BH et al. (2008), Scott I et al. (2012), and Kim SC et al. (2006).

REFERENCE CENTRE of BORON STUDIES

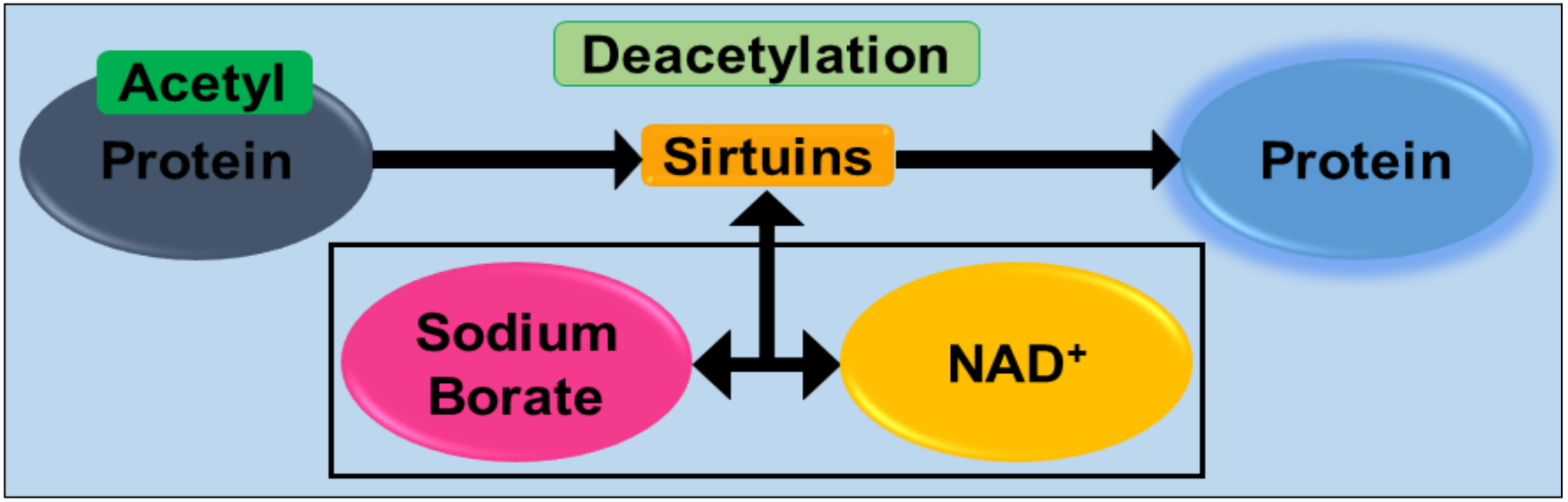
- BOREN (National Boron Research Institute, TURKIYE)
  - Efficiency and spectrum of scientific studies on boron
- APPLICATION:
  - Glass, ceramic, flame retardants, cement, metallurgy, energy, cleaning, bleaching, agriculture, cosmetics, health
  - BNCT: boron neutron capture therapy in cancer

REFERENCE CENTRE of BORON STUDIES

- **Concentrated Borates**
  - Ulexite
  - Tincal
  - Colemanite
- **Refined Borates**
  - Borik Acid
  - Boraks Pentahidrat
  - Boraks Dekahidrat
  - Etibor- 48
  - Sodyum Perborat Monohidrat
  - Sodyum Perborat Tetrahidrat
  - Borax Anhydroust
  - Boron Oxide
- **Speciality Boron Products**
  - Tarımbor (Agricultural Boron)
  - Ahsapbor (Wood Boron)
  - Zinc Borate
  - Cellulosic Insulation Material
  - Boron Nitride
  - Boron-Cement (Boron-Added-Cement)
  - Elementel Boron
  - Sodium Borohydride
  - Trimetyl Borate
  - Boron Carbide

boren
ULUSAL BOR ARAŞTIRMA ENSTİTÜSÜ

BORON vs NAD^+



Interaction between sodium borate and NAD^+ may affect Sirtuins, NAD^+ dependent deacetylases.

(Hunt CD, 2012)

BORON vs NAD^+



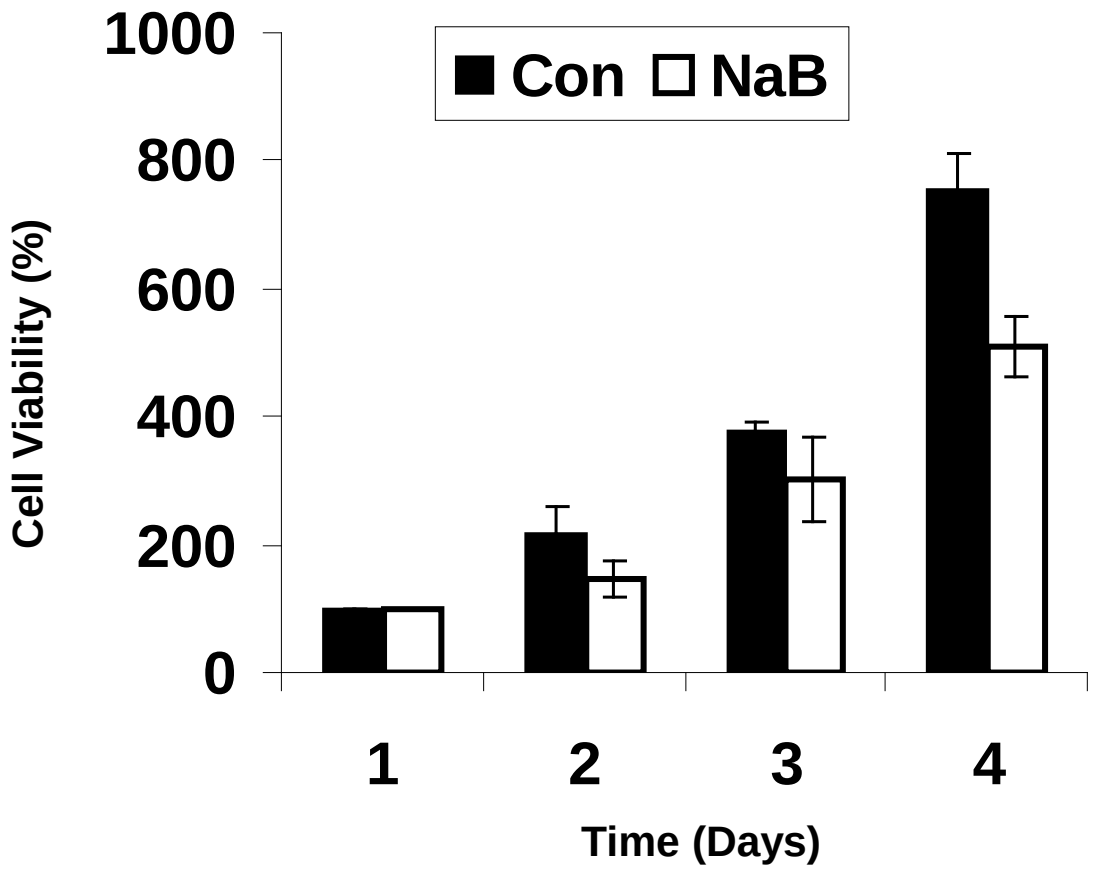
Hep3B cells incubated with Sodium Borate supplemented media

72 h incubation with Serum starvation for 24 h

Cell harvest and sample preparation

Cellular, metabolic, and proteomic analyses

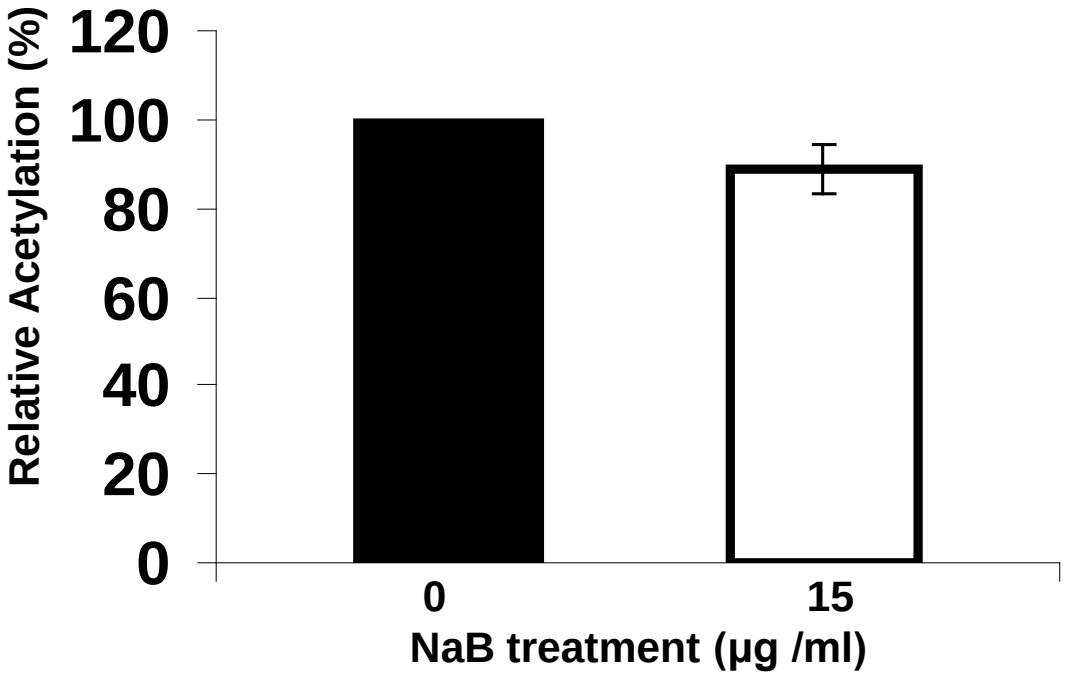
NaB treatment decreased cell proliferation rate



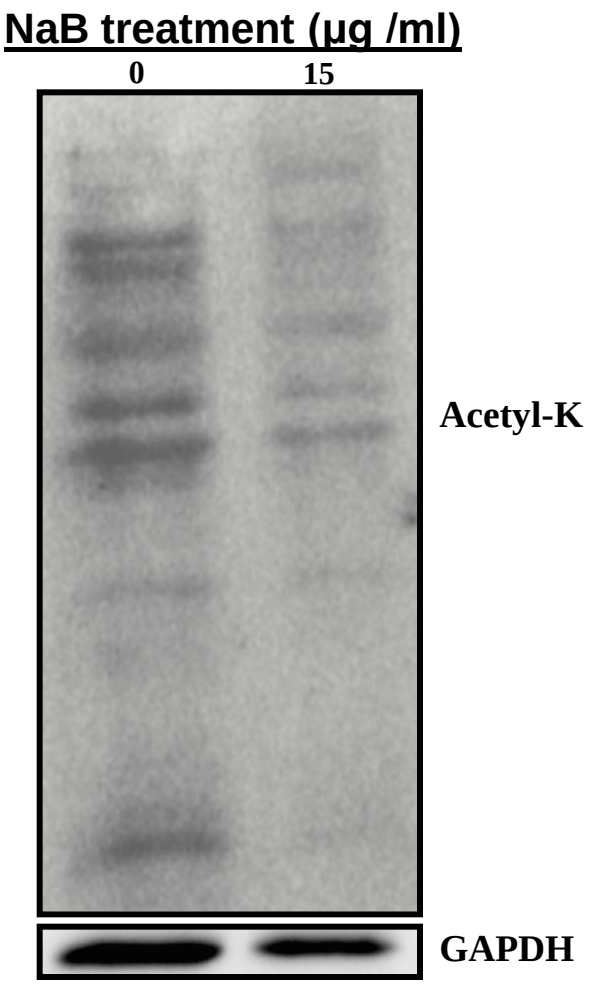
Percent cell viability measured through metabolic activity of cultured HEP3B cells treated with NaB.

NaB treatment decreased overall protein acetylation

A



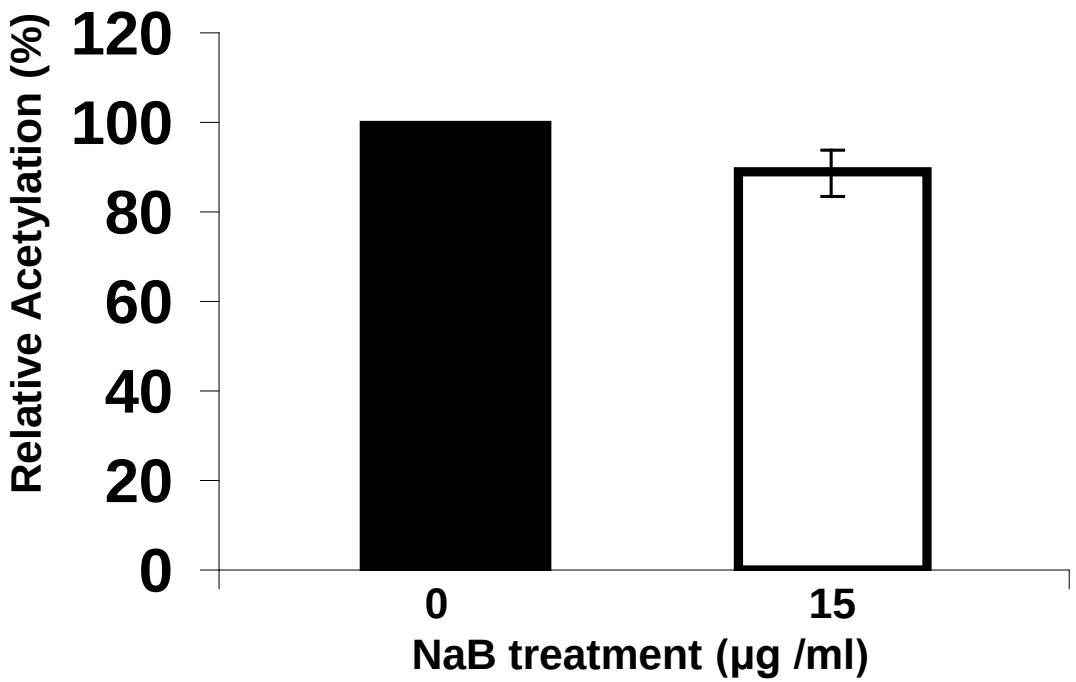
B



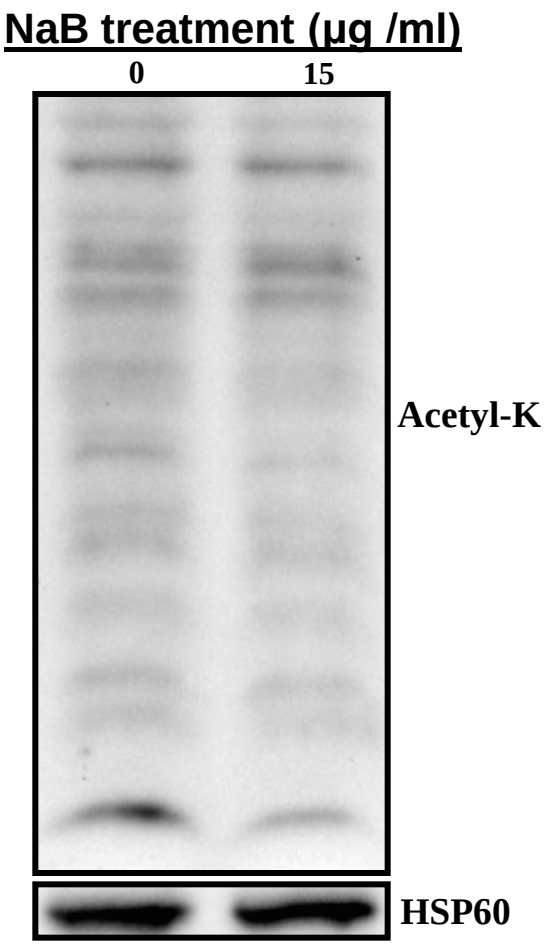
IB analysis demonstrated >10% decrease in whole cell acetylome

NaB treatment decreased overall mitochondrial protein acetylation

A

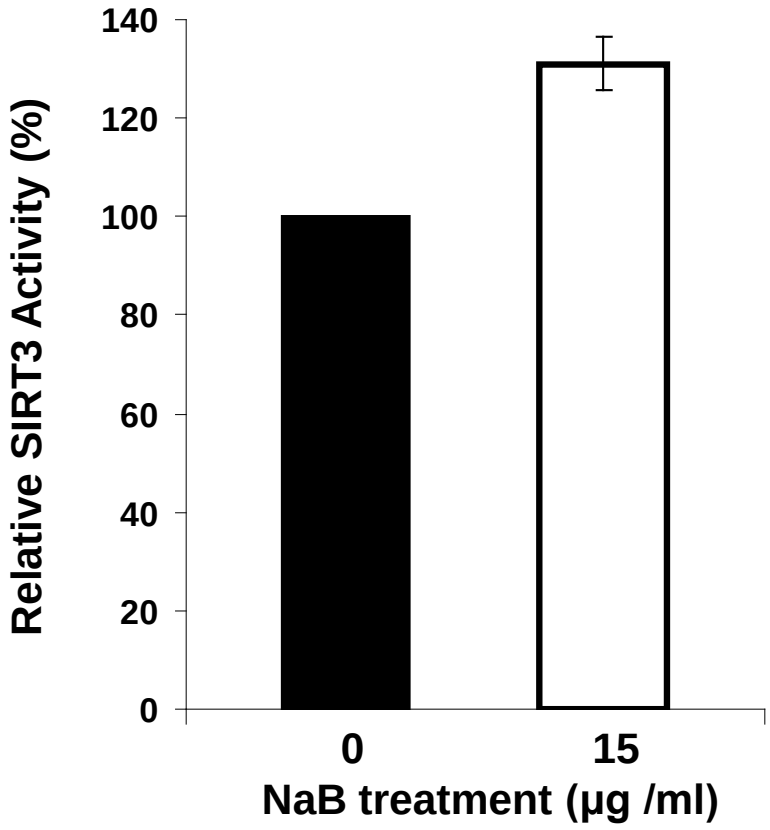


B



IB analysis demonstrated >10% decrease in mitochondrial acetylome

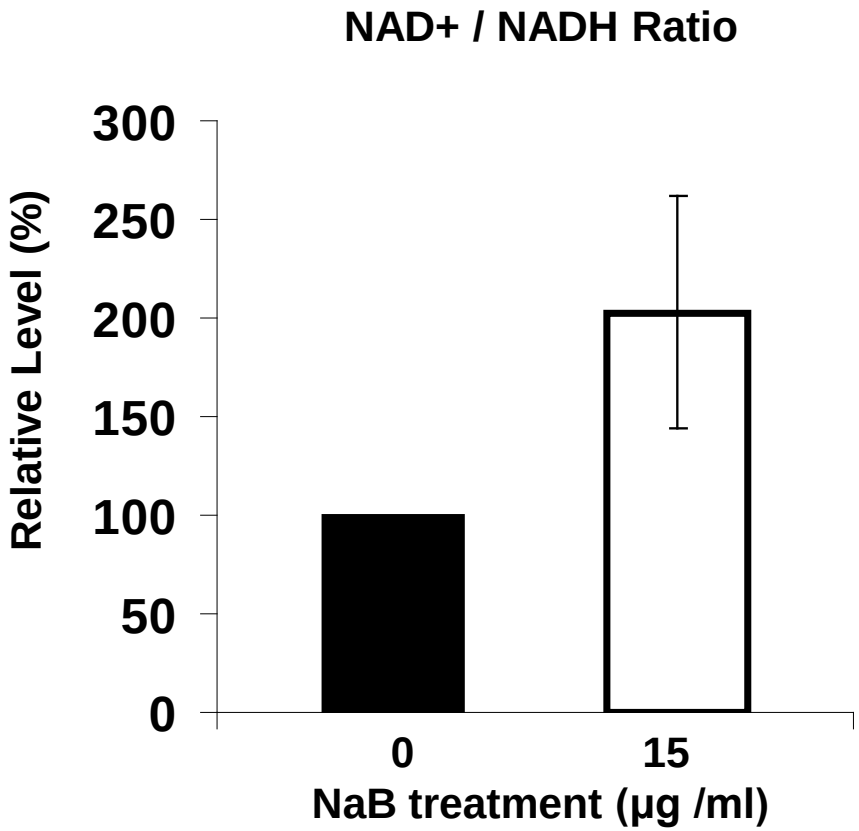
NaB treatment enhanced SIRT3 activity



NaB – NAD interaction elevated SIRT3 activity.

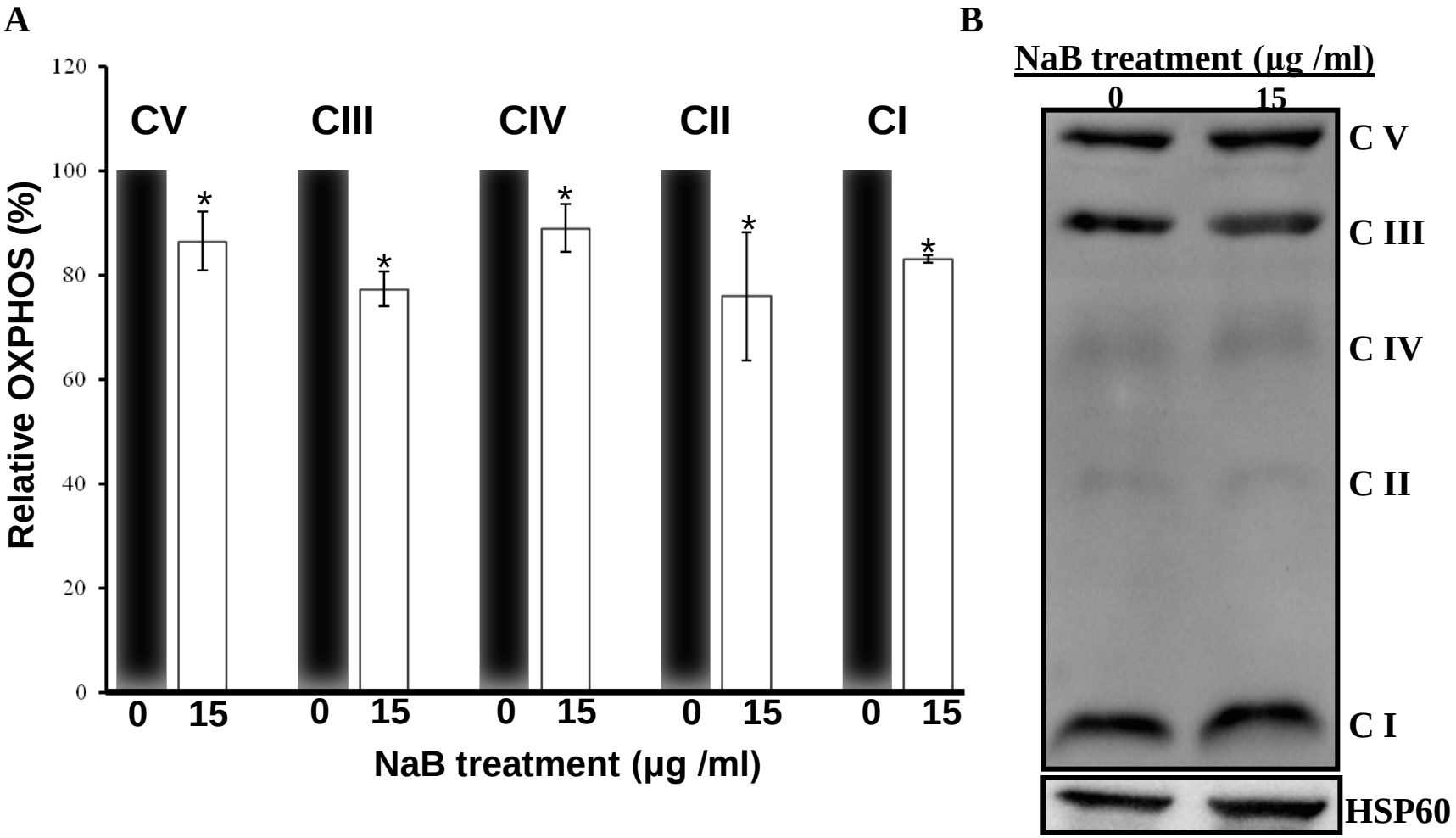
CycLex® SIRT3 Deacetylase Fluorometric Assay Kit

NaB treatment affects metabolism



NaB – NAD interaction elevates NAD+/NADH ratio.

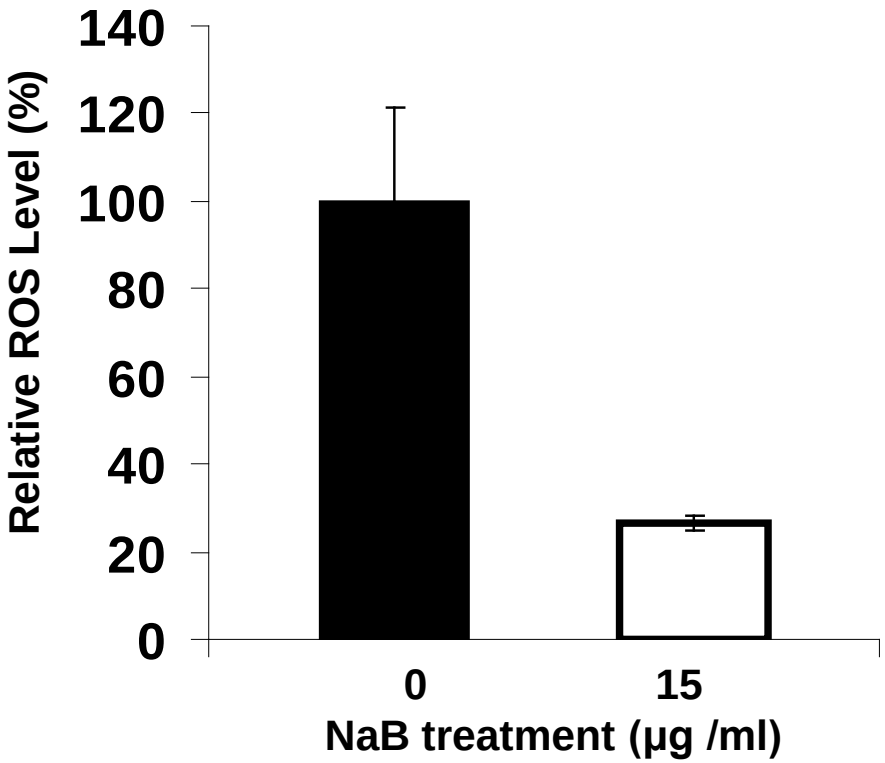
NaB treatment reduced OXPHOS complexes



NaB reduced mitochondrial biogenesis.

OXPHOS Ab cocktail: ATPSA (CV), UQCRC2 (CIII), MTCO1 (CIV), SDHB (CII), NDUFB8 (CI)

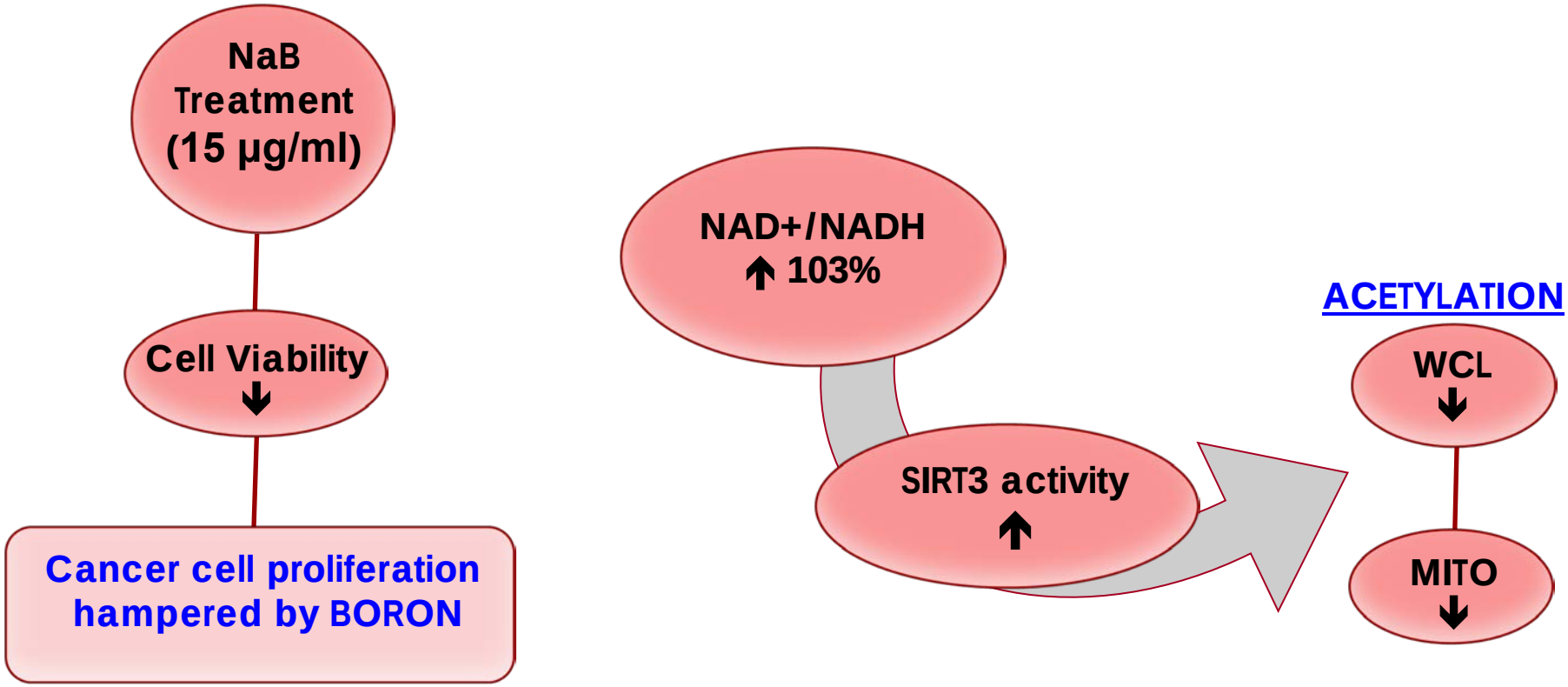
NaB treatment lowered ROS production



NaB reduced ROS generation (>70%).

Abcam DCFDA Cellular ROS Detection Assay Kit

Summary



BORON treatment enhances mitophagy in order to increase mitochondrial quality upon deacetylation.

Future Prospects and Acknowledgement

- Mitochondrial structure analysis with electron microscopy
- Drug supplementation along with boron
- Specific column development for boron-interacting proteins

LAB MEMBERS:

Graduate:

MSc Berna USTUNER

MSc Eray Esendir

Firdevs Cansu ATILGAN

Bihter YAVUZ

Technician: Binnur Herand KIRATLI

Special Thanks:

Yeditepe SAHIN Lab members

FUNDING:

Yeditepe UNIVERSITY

YEDITEPE GENETICS AND BIONEGINEERING PROTEOMICS and MASS SPECTROMETRY LAB.



THANKS

Department web:
www.genetik.yeditepe.edu.tr

Yeditepe Biyoteknology Society:
yeditepebiotech.com
fb.com/pages/Yeditepe-University-Biotechnology-Society

OMICS Aug 4th,2014

Let Us Meet Again

We welcome you all to our future conferences of OMICS Group International

Please Visit:

www.omicsgroup.com

www.conferenceseries.com

www.proteomicsconference.com