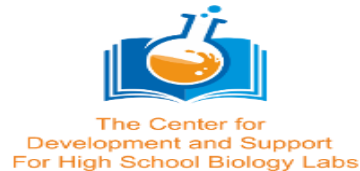


When Biology Education Meets Biology Researchers, the Bio-Inquiry Projects are Taking a Step Up

Waxman Pirchi, Sachyani Dana, Herman Shoshy, Segoli Michal, Parnas Moshe,
Popovtzer Rachela Biran Dvora, Ron Eliora and Zion Michal



אוניברסיטת בן-גוריון בנגב
Ben-Gurion University of the Negev



The Center for Development and Support of Biology Schools' Labs

Academic Administration:

Prof. Michal Zion – Academic Head

Dr. Bruria Agrest – Center Chairperson

Dr. Shoshy Herman – Academic Director

Dr. Pirchi Waxman – Deputy Academic

Lab team & administration :

Skilled and experienced lab workers

Experiment Development Team – Leading Biology Educators

The Center works in close collaboration with the Ministry of Education and in full coordination with the Biology and Science Education Inspectorate.



The Center for Development and Support of Biology Schools' Labs

Developing experiments and teaching materials for lab activity



Professional Development - for teachers and lab technicians



A supply center for materials, organisms. Laboratory Equipment Lending Service



Publishing researches

Contribution Practical Biology Education in School

For Teachers

- Empowering Teachers.
- Teacher-led, pedagogy- driven instruction.
- Strengthening the teacher– student relationship.

Contribution Practical Biology Education in School

For Students

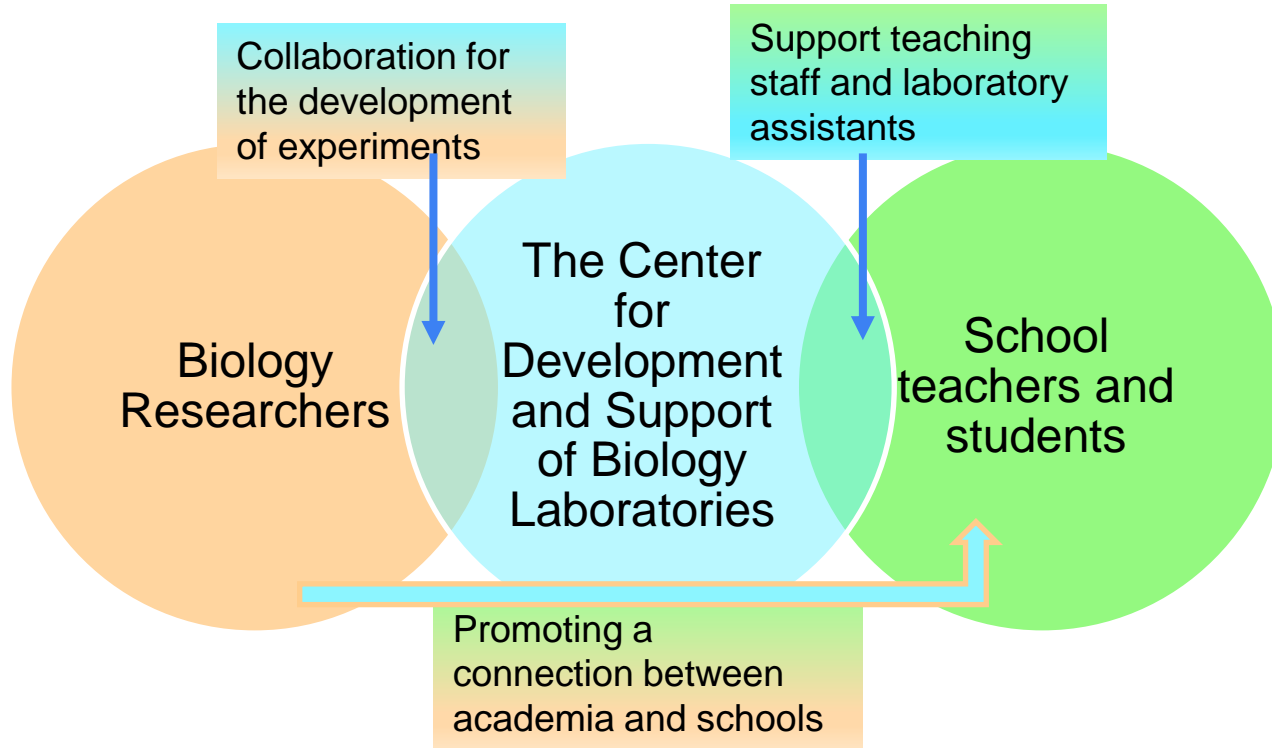
- Nationwide accessibility for all students.
- Thoughtfully designed, balance laboratory days.
- Continuous, process-oriented learning model.
- Promoting inquiry-based teaching and integrating authentic research.

Practical Biology Education in School- Integrating Authentic Research

- Bringing up-to-date biological research into the biology school lab.
- Encouraging excellent students to pursue scientific research pathways and to integrate into academia in the future.

Connecting Biology Research with Practical Biology Education

Advancing Practical Biology Education in Schools



What Does Collaboration Look Like? **Bio-Inquiry Projects are Taking a Step Up**

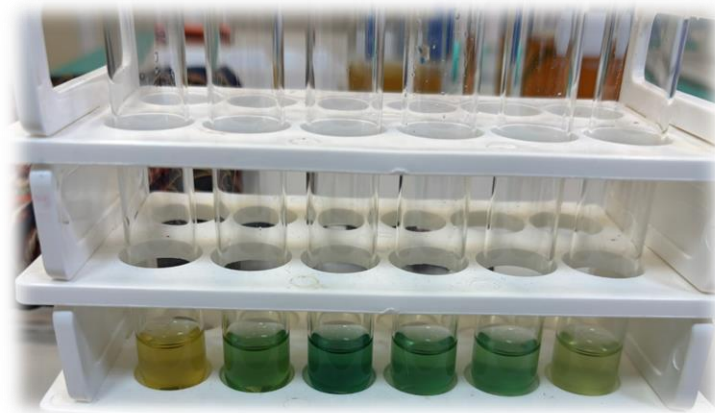
Prof. Eliora Ron and Dr. Biran Dvora Tel Aviv University

Prof. Popovtzer Rachela Bar-Ilan University

Engineered Bacterium as a Biosensor

A genetically engineered bacterium as a biosensor for presence of pollutants and changes in temperatures.

Based on bacterial systems and research developed in the laboratory of Prof. Eliora Ron, Tel Aviv University



The Effect of plant essential oil Concentration on β -Galactosidase Expression in Genetically Modified *E. coli*

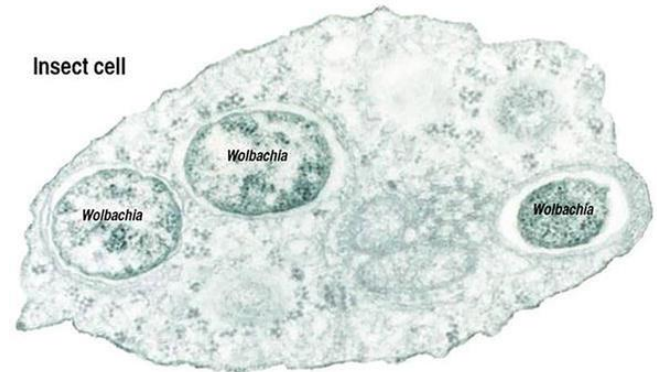
What Does Collaboration Look Like?

Prof. Michal Segoli Ben-Gurion University and Prof.
Elli Gruner from the Arava institute

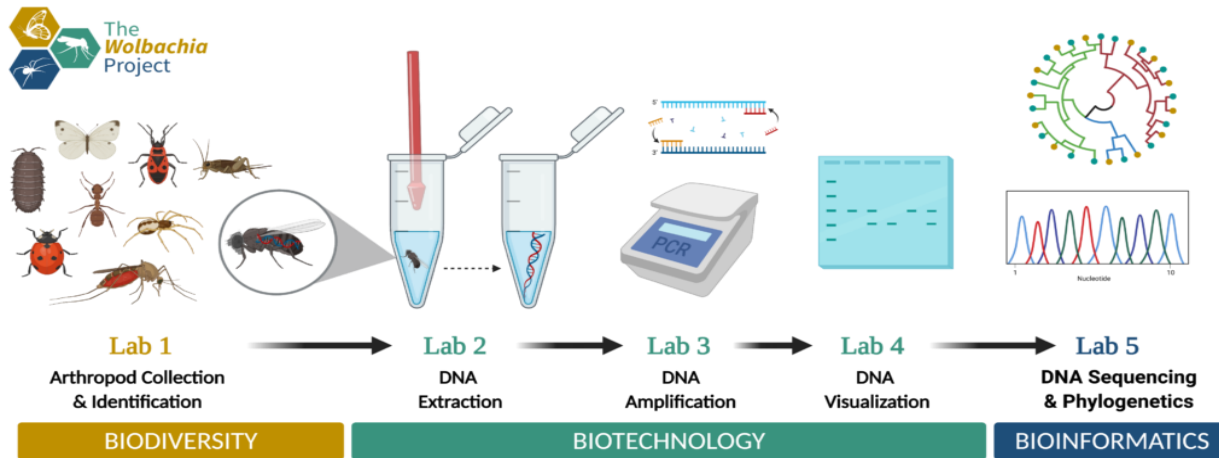
Researcher in Behavioral and Evolutionary
Ecology of Insects and Conservation
Biological Control

The *Wolbachia* project

- Common intracellular bacteria in many insects
- Founded in 2004 by an American biology teacher and researcher.
- Educates students in different topics in biology (Entomology, Microbiology, Molecular Biology, Bioinformatics) through practice



What is the role of the researcher?



- Lectures in class on relevant topics
- Choosing a system
- Help with collecting or dissecting insects
- Formulate research questions

Prof. Moshe Parnas
Shares Insights from our
Collaboration

Motivation

Goal:

- Improve biological studies at high schools
- Introduce neuroscience and genetics
- Introduce current research approaches

Challenges:

- Accessible
- Cheap
- Sophisticated enough

Associative Learning and Memory

- An active field of research
- An interesting question
- Cellular mechanisms
- Circuit Mechanisms
- Clear Behavior
- Genes
- Fast



Associative Learning and Memory

- An active field of research
- An interesting question
- Cellular mechanisms
- Circuit Mechanisms
- Clear Behavior
- Genes
- Fast



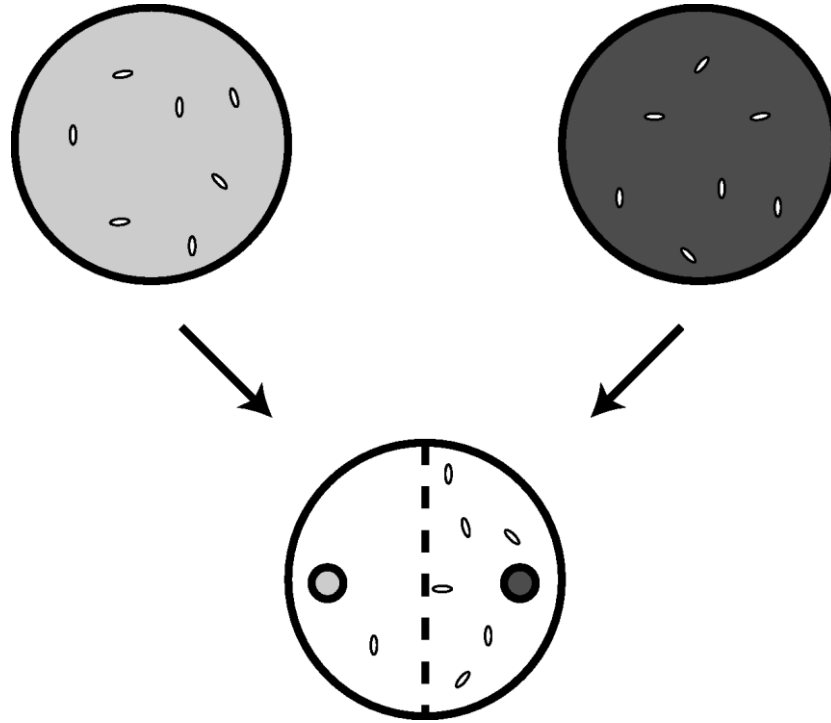
Pavlovian Conditioning of Larval *Drosophila*

Pavlovian Conditioning of Larval *Drosophila*: An Illustrated,
Multilingual, Hands-On Manual for Odor-Taste Associative Learning in Maggots

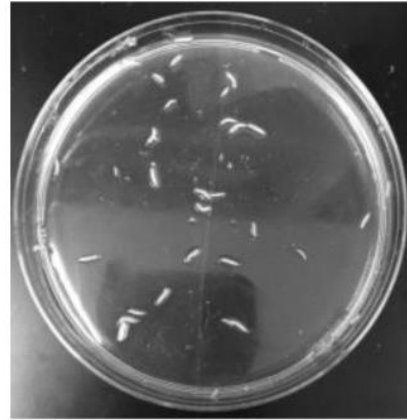


Bertram Gerber

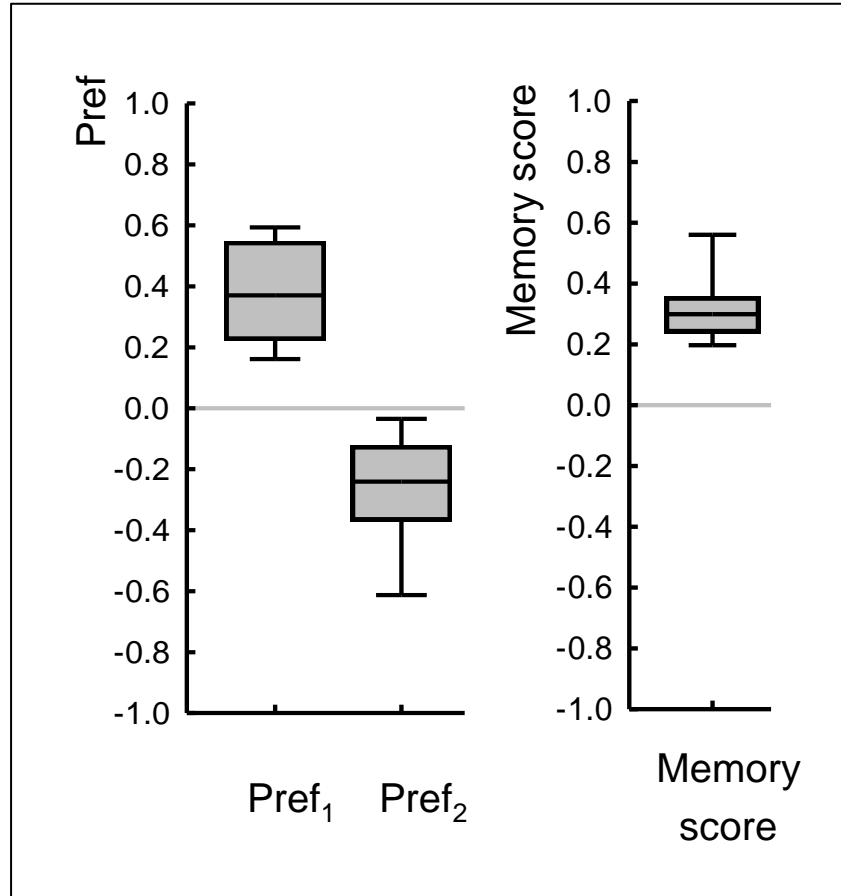
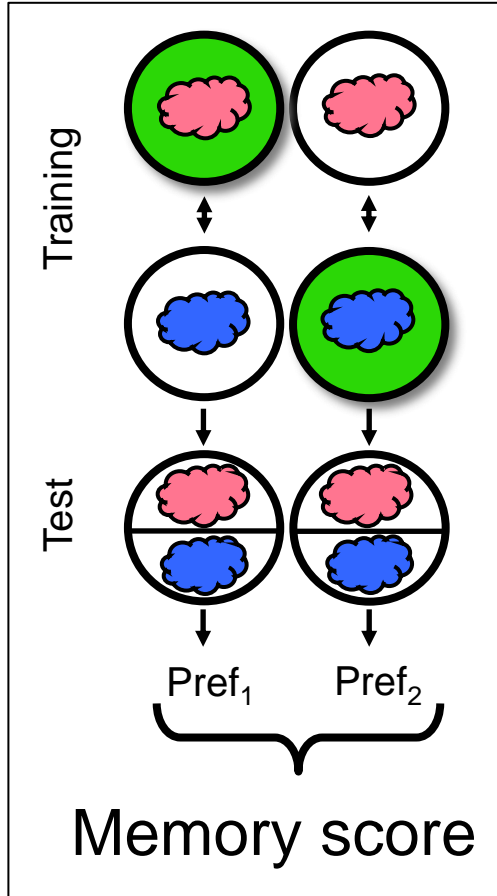
Pavlovian Conditioning of Larval *Drosophila*



Pavlovian Conditioning of Larval *Drosophila*



Pavlovian Conditioning of Larval *Drosophila*



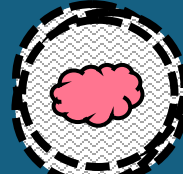
Other Types of Association Paradigm for Larvae



Odour
Sugar(s)



Odour
Bitter
compound(s)



Odour
Vibration



Light
Sugar(s)



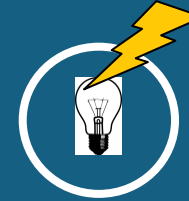
Odour
Low-salt



Odour
High-salt



Odour
Electric
shock



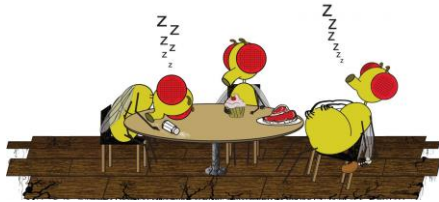
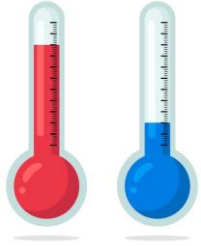
Light
Electric shock



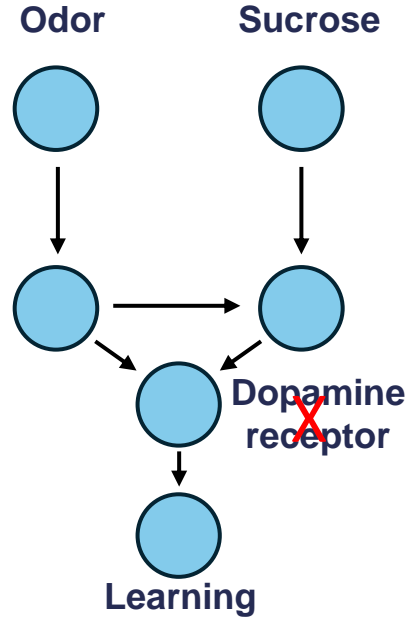
Odour
Amino acid(s)



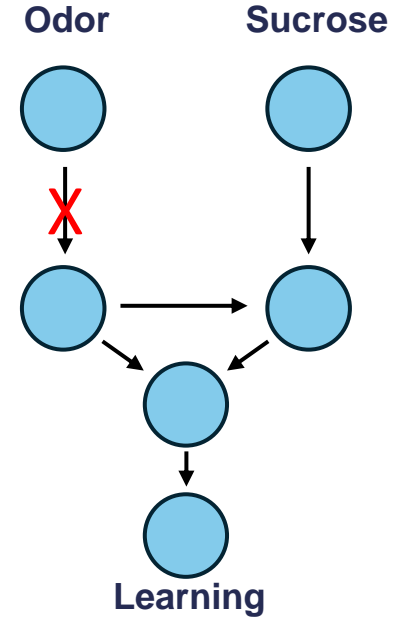
Other Conditions



Environmental



Molecular



Circuit

From Idea to Execution

- Meeting with the development team of “The Center for Development and Support for High School Biology Labs”
- An experiment at my lab
- An experiment at my lab with students
- First teacher training at the Center for Development and Support for High School Biology Labs



From Idea to Execution

- Meeting with the development team of “The Center for Development and Support for High School Biology Labs”
- An experiment at my lab
- An experiment at my lab with students
- First teacher training at the Center for Development and Support for High School Biology Labs

- Training and execution is handled by the Center for Development and Support for High School Biology Labs
- Online support of the PI
- Involvement of PIs from different universities in flies’ maintenance.



Thank you
Any questions?