

DROSOPHILA RESEARCH & TRAINING CENTRE

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LET US BUILD: FROM CELLS TO ORGANISM

REPORT OF THE OUTREACH FUNDED BY BIOCHEMICAL SOCIETY

Introduction:

Drosophila Research and Training Centre (DRTC) is a not-for-profit and non-political organization based in Basorun, Ibadan, Oyo State, Nigeria. It was established for the purpose of facilitating the use of *Drosophila melanogaster* as a cost-effective, alternative animal model for biomedical research and teaching in Sub-Saharan African Countries www.drosophilartc.org. Our *Drosophila* for Schools' arm is an initiative where we use *Drosophila melanogaster* as a model for teaching in Primary and Secondary Schools in Nigeria. **With the funding support from the Biochemical Society, we carried out *Drosophila* outreaches to five secondary schools in Ibadan Nigeria from February to May 2022, Titled: LET US BUILD: FROM CELLS TO ORGANISM**

The rationale for the outreaches was based on the fact that college students will eventually become future leaders of the society. Evidence has shown that early life experiences greatly impact the behavior and decision making in the future (Patel and Prokop, 2019, <http://genestogenomes.org/flies-in-schools/>). Also, in field of science, mutations, which influences gene expression have led to some genetic diseases such as cancer. Such mutation in-turn influences the cells and the whole organism at large. There are currently different models used to study cancer, nevertheless, *Drosophila melanogaster* is a unique whole-animal toolkit that is recently being used both as a genetic and pharmacological model for drug screening for cancer therapy. Thus, the aim of the outreach was to 'catch them young' by stimulating their interests in the Biological sciences using *Drosophila* as a model in cancer biology.

The Objectives

- To show the importance of DNA and mutation associated with the genes in diseases
- To show that the build-up process of an organism begins with the cell
- To understand the use of drosophila in science
- To understand the use of drosophila in cancer study

The Selection Process was easy as we first identified six (6) different schools in Ibadan and wrote letters to the schools to seek permission to carry out the outreaches. Luckily, five (5) schools gladly accepted to participate in the outreaches. In each school, at least twenty (20) students whose names, ages and classes in Senior Secondary Classes 1- 3 were provided were selected for the outreach. In addition, we allowed their Biology and Science teachers to participate. From each of the schools we visited, we selected 2 students to visit our Centre for further training for the phase 2.

Approach for the Outreaches

The outreaches were in two phases: We visited three (3) private and two (2) public secondary schools in the first phase. In the second phase, two students and one biological science teacher participated from each of the 5 schools.

PHASE 1. Visit to 5 Secondary Schools (February 1-11, 2022)

A total of 7 to 10 scientists from DRTC visited each of the selected schools with vials of *Drosophila melanogaster*, teaching tools, dissecting microscopes, centrifuge, micropipette etc. We had both theoretical and practical sessions:

SELECTED SCHOOLS:

1. St. Catherine's College, Aleshinloye, Ibadan, Nigeria.
2. The International School, University of Ibadan, Ibadan, Nigeria.
3. Lagelu Grammar School, Agugu, Ibadan, Nigeria.
4. Milestone College, Ojoo, Ibadan, Nigeria.
5. Queens' School, Apata, Ibadan, Nigeria.

Theoretical sessions: An exposition of the theme of the outreach, Let us build: from cells to organism was presented by Dr Aghogho Oyibo. This covered elements, compounds, biomolecules (carbohydrates, protein, lipids and nucleic acids), cells, tissues, organs and organism. The importance of biomolecules in the building up process was emphasized. Dr Amos O. Abolaji taught basic applications of fruit flies in high school biology. This session also covered *Drosophila* anatomy, life cycle. *Drosophila* in experimental medicine, *Drosophila* disease models, From Gene to Protein – Transcription and Translation.

The Hands-on sessions covered in phase 1:

Microscopy: Fly microscopy: Viewing and identification of different stages of the *Drosophila* development.

DNA folding using origami

Cell molding, in which the students identified and molded selected organelles.

Centrifugation and pipetting skills

DNA Board emphasizing the central dogma (replication, transcription and translation)

Amino Acids puzzle

Interactive session: Students had opportunity to ask questions and interacted with our team.

The schools and each of the students were presented with certificates of participation and teaching materials. The students and teachers were offered refreshments at the end of each outreach.

PHASE 1 (VISIT TO 5 SCHOOLS)

1. Milestone College, situated at Ojoo, Ibadan Oyo state.

Date: 1st of February, 2022. Time 9:00 am to 12:00 pm



Selected Students from Milestone College, Ojoo

1. Olugbade Joy

2. Adewumi Jude Kofi

<https://twitter.com/DrosophilaRTC/status/1488989886761865222>

2. Queens School, Located at Apata, Ibadan, Nigeria.

Date: 3rd February, 2022. Time 10:00 am to 12:00 pm



Selected students from Queens School, Apata.

- 1. Nwaegbeni Mercy Adaeze**
- 2. Abubakri Barakat**

<https://twitter.com/DrosophilaRTC/status/1489583698156699653>

3. International School Ibadan, Nigeria.

Date: 9th February 2022. Time 9:00 am to 12:00 pm



Selected students from International School, Ibadan, Nigeria.

- 1. Gbolahan King**
- 2. Fashae Oluwadunsin**

<https://twitter.com/DrosophilaRTC/status/1491482145365372934>

4. Lagelu Grammar School, Agugu, Ibadan, Nigeria.

Date of visit: 10th of February, 2022. Time 9:00 am to 12:00 pm



Selected students from Lagelu Grammar School, Agugu

1. Wahab Quyum
2. Samuel Mayowa

<https://twitter.com/DrosophilaRTC/status/1491839084700000260>

5. St Catherine's College, Aleshinloye, GRA Jericho, Ibadan.

Date: 11th February, 2022. Time 10:00 am to 12:00 pm



Selected students from St. Catherine College, Aleshinloye.

1. Elim Obisesan
2. Taiwo Jimoh

<https://twitter.com/DrosophilaRTC/status/1492407539908161537>

PHASE 2. Visit of Students to DRTC (May 26, 2022)

Due to the closeness of the second term examinations of the students to the initial selected date (March), the phase 2 was moved to May 26, 2022, which was three weeks after resumption of third term. Here, the two selected students and their biology teacher from each of the 5 schools, visited our research Centre for further training. They arrived few minutes past 9am, and we began with registration followed by opening prayer. Thereafter, the recap of the school outreaches of phase 1 was carried out by the students, but chaired by Mr Onaara Ashaolu. The use of *Drosophila* in cancer research was reemphasized thereafter by Dr Amos O. Abolaji (the Team Lead). Briefly, Dr Oyibo and Miss Racheal showed the students round the facility. We showed the students the various equipment available at our Centre such as HPLC, centrifuges, spectrophotometer, *Drosophila* incubators, weighing balance, CO₂ incubator, microscopes etc. and their functions. There was a short break for tea. Immediately after the break, we had the first practical session on diet preparation.

At 12 noon Professor Oyeronke A. Odunola, Director of Cancer and Molecular Biology Laboratories, Department of Biochemistry and Head of Department of Biochemistry, University of Ibadan, Nigeria gave a career talk titled,

Science Career Choice: Influence on Your Future and the Society. This session ended beautifully with intriguing questions from students followed by pictures with our guest speaker.

There was a competition on amino acid puzzle and folding of DNA origami by all students for 10 minutes each, respectively. The winners of these competitions are Jimoh Taiwo a student from St. Catherine College for (puzzle) and Fashae Oluwadusin, a student from the International School, Ibadan (DNA Origami). Gifts were presented to the winners of the competitions.

Hands-on sessions covered in phase 2 of the outreach:

Preparation of *Drosophila* diet;

Transfer of flies;

Basic fly Genetics;

Fly dissection.

Both tea break and lunch were provided to the students and teachers.

The cost of transportation to and from our Centre was given to each of the schools.

We presented gifts to the five schools through the teachers. The votes of thanks were given by the students and Dr OYIBO AGHOGHO as seen in the attached video.

Selected Pictures: PHASE 2 (VISIT OF SELECTED STUDENTS FROM 5 SCHOOLS TO DRTC)

Date: 26 May, 2022.









<https://twitter.com/DrosophilaRTC/status/1530211644139352066>

<https://www.linkedin.com/company/74033120/admin/>

Evaluation

We evaluated the Biochemical Society-DRTC, 2022 school's Outreaches using;

1. Questionnaires from the students during the phase 1.
2. Video from students during the phase 2. Find attached the video clip <https://www.youtube.com/watch?v=X3MWTM9m4T0>
3. Reports from teachers. Find below the report from the five teachers of the different schools. Please kindly note the questionnaires are still under analysis, the results will be reported and published. Kindly let us know if this can be published in any of the journals or blogs or newsletters of the Biochemical Society.

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QUESTIONNAIRE

1. NAME: AKINTAYO STEPHEN AKINYELE

2. SEX: Male Female

3. School: LAGELU GRAMMAR SCHOOL, AGUAGU, IB.

4. In what way(s) do you think this outreach have impacted the students academically?
The outreach has really impacted the students so much that some of them are now interested in research works. It has exposed in team to many careers in science and they are ready to explore more.

5. What part of this outreach stood out for you and you would like to adopt in teaching your students?
Research works on Cancer and Parkinson's diseases, finding remedies to these scourge to make our life better. Also the area of career choice is highly impactful.

6. What aspect of this outreach you will love us to improve?
Reportage and awareness on this to wider society to really know much on Drosophila.

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QUESTIONNAIRE

1. NAME:

Ogunleye Idowu O.

2. SEX: Male

Female

3. School:

The International School, University of Ibadan, Ibadan.

4. In what way(s) do you think this outreach have impacted the students academically?

It has tremendously impacted the students improved their practical skills and stimulated their interest in the field of Science.

5. What part of this outreach stood out for you and you would like to adopt in teaching your students?

The career talk was very interesting. The viewing and dissection of the fly under the microscope.

6. What aspect of this outreach you will love us to improve?

If it is possible to extend it to the study of other lower animals. Also, it will be appreciated if the career talks are moved into the schools for more participation of students.

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QUESTIONNAIRE

1. NAME:

Ibitayo Lawrence Toy

2. SEX: Male

Female

3. School:

St. Catherine's College, Akeshinloye

4. In what way(s) do you think this outreach have impacted the students academically?

In all aspects, I believe students learnt and gain knowledge especially the aspects of diet preparation and dissection under microscope.

5. What part of this outreach stood out for you and you would like to adopt in teaching your students?

Dissection under microscope

6. What aspect of this outreach you will love us to improve? Based on my observation, all the aspect were perfectly handled, although there is room for improvement.

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QUESTIONNAIRE

1. NAME: MRS ADENIYI ABIDEMI A.

2. SEX: Male Female

3. School: QUEEN'S SCHOOL, APATA, IBADAN.

4. In what way(s) do you think this outreach have impacted the students academically?
It has given them a very good template in research, work and also stirred up their interest in Biology as a subject.

5. What part of this outreach stood out for you and you would like to adopt in teaching your students?
The Research aspect. It will help me to improve the handling of practicals, use of specimens etc because practical is an integral part of Biology as a subject.

6. What aspect of this outreach you will love us to improve?
I think we need a more spacious venue for the next outreach to accommodate both the students and their teachers.

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QUESTIONNAIRE

1. NAME: Mr Ojo Oluwadamilola Femi

2. SEX: Male Female

3. School: Milston College

4. In what way(s) do you think this outreach have impacted the students academically?
It enhances their histology experiences with the help of the microscopes
The knowledge of nucleic acids (DNA and RNA)

5. What part of this outreach stood out for you and you would like to adopt in teaching your students?
using Drosophila to teach system of reproduction, digestive etc

6. What aspect of this outreach you will love us to improve?

Conclusion: Indeed, these outreaches sponsored by the Biochemical Society was a huge success. The aim and objectives were achieved. We will love to have more of these outreaches in order to reach more students.

Acknowledgements

1. We are deeply thankful to Biochemical Society for the outreach grant used to carry out these outreaches to the 5 schools.
2. We are grateful to Professor Rose Cagan for the cancer flies
3. We thank all the managements and staff of the 5 schools for accepting our invitations.
4. We thank Professor Oyeronke A. Odunola from Department of Biochemistry, University of Ibadan, for giving the **career talk and her continued** support before and during the outreaches.
5. Many thanks to all the team members of DRTC for the time invested to organize the outreaches

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