

**Workshop for Athens Drive High School Teachers by National Institute of Environmental Health Sciences (NIEHS)**

**Agenda**

**November 29, 2017**

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| **Time** | **Activity** | **Lead** |
| 8:45 am | Teachers arrive at NIEHS. |  |
| 8:45-9:00 am | Security check-in (main lobby) |  |
| 9:00-10:00 am | Welcome and Campus Tour  Director of the Office of Science Education & Diversity at NIEHS will welcome the group and give an overview of the institute, followed by a campus tour. | Ericka Reid, Ph.D.,  M. Ed.  John Schelp, M.P.A. |
| 10:00-10:15 am | Program introduction | Huei-Chen Lao, Ph.D., M.P.H. |
| 10:15-10:30 am | Break |  |
| 10:30-11:30 am | Gene editing and CRISPR; the application of CRISPR-Cas9 in treating human diseases such as sickle cell anemia; the potential for using CRISPR-Cas9 to engineer gene drives; the benefits to humanity offered by this method; the possibility of unwanted ecological effects, and near-certainty of spread across political borders | Rodolphe Barrangou, Ph.D., Associate Professor, Department of Food, Bioprocessing, & Nutrition Sciences, North Carolina State University |
| 11:30 am-12:15 pm | Lunch |  |
| 12:20-1:00 pm | The genetics of sickle cell anemia and sickle cell trait; the evolutionary advantages of sickle cell gene carrier; Hardy-Weinberg equation calculation; classroom activities, teacher discussion | Huei-Chen Lao, Ph.D., M.P.H. |
| 1:00-1:40 pm | Examining sickle cell anemia from a societal perspective—Integrating people, history, and social context; activity and teacher discussion | Huei-Chen Lao, Ph.D., M.P.H. |
| 1:40 pm-1:50 pm | Break |  |
| 1:50 pm-2:35 pm | Biotechnology: Environment, Ecology, Ethics, and the Future | Bob Petrovich, Ph.D. |
| 2:35 pm-3:15 pm | DIY food colors gel-electrophoresis demonstration. Teachers predict the movement of each food color, based on the structure, molecular weight, and charge of each dye contained in the food colors; discuss other Tri DIYBio resources | Tom Randall, Ph.D. |
| 3:15-3:45 pm | Reflection, integration, potential lesson plans and project, brief presentation by teachers |  |
| 3:45—4:00 pm | Teachers complete survey and depart NIEHS |  |

12:20—12:35 pm: Sickle cell disease (SCD), brief introduction, symptoms, and activity

12:35—1:10 pm: Malaria Hypothesis. Activity, Hardy-Weinberg equation calculation

1:10—1:15 pm: Break

1:15—1:40 pm: SCD in the United States—Integrating people, history, and social context into biology learning; case study