

GREATER SAN DIEGO SCIENCE & ENGINEERING FAIR (GSDSEF)
PROJECT PROPOSAL/SIGNATURE* FORM (GSDSEF-1, 2015)

This form must be completed and signed prior to starting project work. It must be placed in the student's notebook with an ABSTRACT OF THE PROJECT for the GSDSEF Screening Fair. (Use the "Tab" key to move from line to line)

1. Project Title Can Liquid Crystal Be Used As An Innovative System to Detect Bacteria

Is this a continuation of a previous project? Yes No

2. STUDENT'S NAME (Last, First, Middle) Hui, Jackwin K

2a. Partner's Name (for Senior Division 2 person projects only) _____

EACH SENIOR DIVISION PARTNER MUST SUBMIT A SEPARATE PROJECT PROPOSAL FORM.

3. Address, City, Zip 11779 Fantasia Court, San Diego, CA 92131

4. Phone (858) 564 - 8992 email jackwin.iwillwin@gmail.com

5. School Marshall Middle School Grade 8

6. Teacher Mrs. Elaine Gillum

7. This project involves (check all that apply):

- Live Vertebrate Animals (GSDSEF-2, 2015)
- Humans as subjects, helpers, or interviewees (GSDSEF-3, 2015)
- Hazardous Substances (anything that could cause injury) (GSDSEF-4, 2015)
 - Chemicals
 - Infectious Agents
 - Bacteria, Fungi and/or Molds
 - Mutagenic Agents
 - Carcinogenic Agents
 - Teratogenic Agents
- Human or Other Vertebrate Tissue (GSDSEF-5, 2015)

8. WHERE REQUIRED (see #7 above), the following supplemental forms must be completed and included with the project proposal form (CHECK ALL THAT APPLY):

- Certification of Humane Treatment of Live Vertebrate Animals (GSDSEF-2, 2015)
- Certification of Compliance of Research Involving Humans (GSDSEF-3, 2015)
- Certification of Hazards Control (GSDSEF-4, 2015)
- Certification of Vertebrate Tissue Source & Safety (GSDSEF-5, 2015)

9. Location where experimental procedures will take place: Axikin Pharmaceuticals

4940 Carroll Canyon Road, Suite 100, San Diego, CA 92121

10. People, companies, etc. providing equipment, materials, workspace: Dr. Ly, Tai Wei; Sr. Director,

Drug Development Technologies; Axikin Pharmaceuticals, Fisher Scientific, Carolina Biological

11. Describe, in 200 – 250 words, the planned project/experiment and the procedures to be used:

Liquid crystals are used in television screens, computers screens, monitors, watches, and many other daily appliances. However, the unique properties of liquid crystals can also be utilized to detect harmful bacteria, which in turn could help detect diseases. Upon the discovery and detection of the bacteria, doctors will be able to provide treatments to patients earlier before the diseases fully develop. Such early detection of the disease can save both lives and money. The objective of this project is to demonstrate if an innovative system such as liquid crystals can be used for the detection of bacteria such as Staphylococcus epidermidis.

Utilizing the unique property of liquid crystals, the experimenter can conclude that liquid crystals will be very helpful to detect bacteria during its early stages when it is reproducing. By viewing the patterns existed in the liquid crystal, it is possible to determine if bacteria are beginning to develop. Based on the liquid crystal properties, the hypothesis for this experiment is that 1) liquid crystal can be used to detect the presence of bacteria; 2) the concentration with 65% cholesteryl oleyl carbonate, 25% cholesteryl pelargonate, and 10% cholesteryl benzoate will provide the most promising results at room temperature as the optimal operating temperature of stabilizing phase in such liquid crystal is between 17 to 23° Celsius.

The materials needed to create liquid crystals are cholesteryl oleyl carbonate, cholesteryl pelargonate, and cholesteryl benzoate. Bacteria used in this experiment are Staphylococcus epidermidis bacteria. Analytical balances and weighing boats will be used to weigh the chemicals. After creating several different systems, Staphylococcus epidermidis bacteria will be placed in the prepared liquid crystal systems accordingly and the impact of bacteria were observed. All the data is collected and analyzed at various concentrations with and without bacteria using a Kinetic ELISA Microplate Reader.

Just before the screening fair, attach a 200-250 word ABSTRACT of your project to this form.

***Continue to next page for required Signatures**

GREATER SAN DIEGO SCIENCE & ENGINEERING FAIR
(GSDSEF) PROJECT PROPOSAL/SIGNATURE FORM (GSDSEF-1, 2015)
REQUIRED SIGNATURES:

Student:

I have read the *Rules and Regulations* of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR and certify that my project complies with them. I understand that failure to meet the terms of these rules and regulations will result in the disqualification of my project.

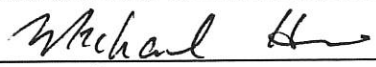
SENIOR DIVISION: GSDSEF forms meet the requirements of California law; therefore, all Senior Division students agree that, should they be selected to compete at the 2015 *Intel International Science and Engineering Fair (Intel ISEF)*, when they sign all required *Intel ISEF* forms they will predate them to agree with the date on this form.

 17 September 2014

Student Signature/Date

Parent/Guardian:

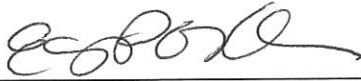
I am aware of all potential safety hazards connected with this project, approve the precautions being taken to ensure my student's safety and will, when appropriate, provide guidance and/or supervision. I understand that failure to comply with *Rules and Regulations* of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR will result in the disqualification of the project.

 17 September 2014

Parent Signature/Date

Teacher:

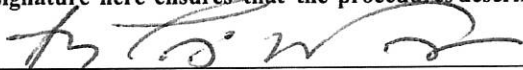
I approved this project prior to the student beginning work on it and verified that it complies with the *Rules And Regulations* of the GREATER SAN DIEGO SCIENCE AND ENGINEERING FAIR. Any concerns about the project's design, appropriateness, safety, or legality were submitted to the GSDSEF Scientific Review Committee (SRC) for approval prior to allowing the student to proceed. I understand that failure to comply with the Fair's *Rules And Regulations* will result in the disqualification of the project. I will provide all needed supervision (other than that specified on other included forms) and will ensure that this proposal and all required supplemental forms are included in the student's notebook at the screening fair. I will have the student, if invited to apply for entrance to the GSDSEF, submit all SRC requested certification forms with their 2015 *Application for Entrance*.

 9-17-14

Teacher Signature/Date

Additional Advisor (if required)

When certification forms (GSDSEF 2, 3, 4 or 5, 2015) are signed by someone in addition to the science teacher, a signature here ensures that the procedures described on these forms will be followed.

 SEPT. 17, 2014

Additional Advisor Signature/Date