

PERALTA COMMUNITY COLLEGE DISTRICT
Board of Trustees Agenda Report
For the Trustee Meeting Date of September 16, 2008

ITEM # 8

ITEM TITLE: *(Please define the subject; e.g., change order – Berkeley City College)*

Consider Authorization to apply for a new proposal with the National Institute for Health and Peralta Community College, Berkeley City College

Presenter: Interim Wise Allen

SPECIFIC BOARD ACTION REQUESTED:

ITEM SUMMARY: *(PLEASE DISCUSS THIS ITEM)*

Berkeley City College's (BCC) Bridges to Stem Cell Research Proposal will serve undergraduate students enrolled in one of two biotechnology programs, the Certificate or the A. S. degree in Biotechnology. The proposal will prepare students, particularly minority students, to obtain positions in the field of stem cell research by providing them with hands-on laboratory experience as well as academic instruction. A second purpose is to encourage students to pursue careers as stem cell researchers.

Students will be selected for 9-month internships in laboratories affiliated with Children's Hospital Oakland Research Institute (CHORI) and the University of California, Berkeley (UCB). Starting with 6 students the first year, a total of 21 students in 3 years will participate in the stem cell research in selected laboratories. Students completing the internship and required courses will finish the A.S. degree in Biotechnology or Certificate in Biotechnology with a Specialty in Stem Cell Biology. The amount to be approved shall not exceed \$1 million for 3 years. Funding Agency: National Institute for Health.

BACKGROUND/ANALYSIS:

ALTERNATIVES/OPTIONS:

EVALUATION AND RECOMMENDED ACTION:

SOURCE OF FUNDS (AND FISCAL/BUDGETARY IMPACT):

Funding Agency: National Institute for Health.

NO IMPACT

OTHER DEPARTMENTS IMPACTED BY THIS ACTION (E.G. INFORMATION TECHNOLOGY):

YES _____ No X

COMMENTS:

WHO WILL BE PRESENTING THIS ITEM AT THE BOARD MEETING?

VICE CHANCELLOR WISE ALLEN, EDUCATIONAL SERVICES

DID A BOARD STANDING COMMITTEE APPROVE THE ITEM? YES _____ No X

IF "YES", PLEASE INCLUDE THAT INFORMATION IN YOUR SUMMARY.

PLEASE ACQUIRE SIGNATURES IN THIS ORDER:

DOCUMENT PREPARED BY:

Prepared by: Carmen N. Fairley, Staff Services Specialist *C. Fairley* Date: 10/08/08
[Enter Your Name and Title of Individual]

DOCUMENT PRESENTED BY:

Prepared by: Wise Allen, Vice Chancellor *Wise Allen* Date: 10/9/08
[Enter Name of College President or Vice-Chancellor or Manager,
and Title of Individual]

FINANCE DEPARTMENT REVIEW

Finance review required Finance review *not* required

If Finance review is required, determination is: Approved Not Approved

If not approved, please give reason: _____

Signature: *Thomas Smith* Date: 10.8.08
Thomas Smith, Vice Chancellor for Finance and Administration

GENERAL COUNSEL (Legality and Format/adherence to Education Codes):

Legal review required Legal review *not* required

If Legal review is required, determination is: Approved Not Approved

Signature: _____ Date: _____
Thuy T. Nguyen, General Counsel

CHANCELLOR'S OFFICE APPROVAL

Approved, and Place on Agenda Not Approved, but Place on Agenda

Signature: *Elihu Harris* Date: 10/8/08
Elihu Harris, Chancellor

National Institute for Health

Berkeley City College's (BCC) Bridges to Stem Cell Research Proposal will serve undergraduate students enrolled in one of two biotechnology programs, the Certificate or the A. S. degree in Biotechnology. The proposal will prepare students, particularly minority students, to obtain positions in the field of stem cell research by providing them with hands-on laboratory experience as well as academic instruction. A second purpose is to encourage students to pursue careers as stem cell researchers.

Students will be selected for 9-month internships in laboratories affiliated with Children's Hospital Oakland Research Institute (CHORI) and the University of California, Berkeley (UCB). Starting with 6 students the first year, a total of 21 students in 3 years will participate in the stem cell research in selected laboratories. Students completing the internship and required courses will finish the A.S. degree in Biotechnology or Certificate in Biotechnology with a *Specialty in Stem Cell Biology*.

The *Specialty in Stem Cell Biology* will involve a stem cell laboratory techniques class offered by UCSF, a 9-month internship in a research laboratory at CHORI or UCB, a scientific instrumentation course in advanced techniques at BCC, U.C. Berkeley's decal class entitled *Stem Cells: Science and Society*, and participation in the many stem cell and regenerative medicine seminars, workshops and retreats available at both CHORI and UCB. These latter 'enhancement activities' include the Fellows Conference that meets weekly to discuss basic, translational and clinical research, seminars offered by the Berkeley Stem Cell Center, the Berkeley Stem Cell Center's annual retreat at Asilomar, and the Bay Area Stem Cell Club.

The stem cell specialty will complement the biotechnology training offered at BCC that includes two sequential courses in scientific instrumentation that cover the basics of working in laboratories, microbiology, applied immunology, applied molecular genetics, scientific literature, and bioethics. An introduction to tissue culture biology and techniques is included in both the immunology and genetics courses.

Students will be selected for the Stem Cell Internships based on the amount of course work completed, genuine interest in stem cell research, ability to work in groups and independently, and acceptability to the host laboratory personnel.

Stem-cell research spans the disciplines of molecular biology, bioengineering, material science engineering and integrative biology. Laboratories at CHORI and UCB willing to host interns are engaged in a wide variety of research areas including hippocampal neurogenesis, olfactory neurogenesis, angiogenesis, telomerase and adult stem cells, cord blood transplantation, gene targeting and stem cell engineering to name a few studies. In all, there are more than 40 laboratories at the two institutions engaged in stem cell research, and thus far 17 have agreed to participate in the Bridges Program.

Overall Program Design

Berkeley City College's (BCC) Bridges to Stem Cell Research Proposal will serve undergraduate students enrolled in one of two biotechnology programs, the Certificate or the A. S. degree in Biotechnology. The majority of undergraduate students in these two programs are underrepresented minorities. They are already highly motivated to pursue careers in biomedical research in California and familiar with basic laboratory techniques. The purpose of this Bridges Proposal is to prepare these students, particularly members of racial and ethnic minorities underrepresented in the health sciences, to obtain positions in the field of stem cell research by providing them with hands-on laboratory experience as well as academic instruction. A second purpose is to encourage students to pursue careers as stem cell scientists and thus, continue their education until they have obtained the required advanced degree.

Students will be selected for 9-month internships in laboratories affiliated with Children's Hospital Oakland Research Institute (CHORI) and the University of California, Berkeley (UCB). Starting with 6 students the first year, a total of 21 students in 3 years will participate in the stem cell research in selected laboratories. Students completing the internship and required courses will finish the A.S. degree in Biotechnology or Certificate in Biotechnology with a *Specialty in Stem Cell Biology*.

The *Specialty in Stem Cell Biology* will involve the development of new courses at Berkeley City College as well as additions to courses that are either in existence or planned at BCC. It will involve the establishment of 9-month internships at Children's Hospital Oakland Research Institute and the University of California, Berkeley and arrangements for students to participate in 2 courses offered outside of BCC, one of which is the stem cell technique course. Along with the required courses, students will be expected to attend seminars, workshops and retreats offered at both host institutions and participate in the mentoring and assessment process that will be in place to ensure their support and success.

Below are brief descriptions of (1) The biotechnology programs at BCC, (2) a list of new courses that will be added for a stem cell specialty should we be funded (3) adjustments to pre-existing classes to incorporate and address issues pertaining to stem cell and regenerative medicine, (4) other courses offered outside BCC that will be part of the new specialty and (5) how stem cell courses and internships will be integrated into the Biotechnology Programs at BCC.

(1) Biotechnology Programs at Berkeley City College

BCC offers 3 biotechnology programs: Level One Certificate, Certificate in Biotechnology and the Associate of Science in Biotechnology. The Level One Certificate has been designed for students who are either still in high school, or are mature adults re-entering the workforce. The two key courses are Scientific Instrumentation 230A: Introduction to the laboratory and Readings in Science. In the introductory laboratory course, students gain facility with laboratory math, making solutions and media, the use of hand-held measuring devices, reading protocols, maintaining notebooks, handling hazardous materials and good laboratory practices. The certificate also includes courses in English, math, CIS and counseling. The students can proceed from here into either the Certificate or the A.S. degree.

The difference between the A.S. degree in Biotechnology and the Certificate in Biotechnology is that general education courses are required to receive the degree, but not required for a certificate. Students must complete a semester of inorganic chemistry, either transfer or

introductory level, an introduction to organic and biochemistry, a course in biology, either transfer or introductory level, a course in physics, math through pre-calculus, English 1A and a course in CIS.

The Biotechnology Related courses that must be completed for the degree are Bioethics, Scientific Literature, Scientific instrumentation 230B: Fermentation, Microbiology, Applied Immunology and Applied Molecular Genetics. Immunology and genetics are the most advanced courses and cover standard experimental techniques associated with immunological assays including ELISA and immunoelectrophoresis, protein chemistry (protein isolation and purification, assessment of activity, western blot, etc), tissue culture, isolation and manipulation of DNA and RNA, uses of PCR, DNA sequencing, karyotyping and bioinformatics. In all biotechnology laboratory classes students conduct experiments in small groups or alone and must make up their own solutions and buffers.

(2) New classes at Berkeley City College

1. **Scientific Instrumentation 230C: Advanced techniques in cell manipulation** 2 units (1 hr lecture and 3 hrs lab/week for 17.5 weeks: Basic cell culture technology, immunohistochemistry, fluorescence-activated cell sorting and analysis, micromanipulation techniques, cell transplantation and animal modeling techniques. *Prerequisite:* Bio 32 (scientific literature), Bio 33 (applied immunology) or Bio 34 (applied molecular genetics).

Comments: The prerequisite courses listed above have pre-requisites of chemistry, biology, microbiology, scientific instrumentation 230 A or 230B, pre-calculus and English 1A.

The addition of a section, e.g. 230C, to a pre-approved course and program by the State of California requires only that it be approved by the college and district curriculum committees. Thus, this class could be offered as early as the Fall semester 2009.

2. **Internship in stem cell research, Bio 48 UI, 8 units.** Nine-month, 40 hour/wk internship in a research lab at Children's Hospital Oakland Research Institute or the University of California, Berkeley. *Prerequisite:* Enrollment in the Biotechnology program along with the Specialty in Stem Cell Biology and completion of selected biology, chemistry, math and English courses. ***Internships are by invitation only.***

Comments: This internship will require students to submit progress and final reports and participate as guest lecturers in selected biotechnology and biology classes including the Science and Medicine in the 21st Century detailed below and scientific instrumentation 230A that is the entry point for new students. Both UCB and CHORI are readily accessible to students by walking or public transportation.

3. **Science and Medicine in the 21st Century: A look at Stem Cells**, 2 units (2 hrs lecture): A scientific, ethical and legal look at the use of stem cells and the promises and challenges facing scientists, clinicians and communities. Topics will include types of stem cells, cellular therapies: experimental and non-experimental, obstacles to progress, and selected medical conditions, e.g. Alzheimer's.

Comments: This course must first be presented to the curriculum committees of Berkeley City College and the Peralta Community College District as an experimental

class and given the number Bio 48 UA. After 2 years it can be formalized and given a recognizable transfer number.

A course Reader will be created that includes scientific, bioethical and legal articles relevant to the use of stem cells. Appropriate texts will also be investigated. Guest lecturers and panels of specialists will be invited to participate in this class. It will be advertised in the community as a new course open to the public and it will be scheduled for an evening time period.

(3) Additions to planned and/or on-going classes and seminars

3. **Science Seminar Series** (may be taken by biotechnology students for 0.5 units). The science department is launching a seminar series starting Spring 2009. Guest lecturers will be invited from a range of disciplines including stem cell and regenerative medicine, nanotechnology, integrative biology, space sciences and others.

4. **Humanities 30A: Bioethics** (one of the sections of Humanities 30A is devoted to bioethics and is part of the biotechnology offerings). The sociological, bioethical and legal issues surrounding stem cell research will be presented and discussed in more depth. A panel of guest lecturers representing different aspects of stem cell research will be invited.

Comments: The bioethics course was initially developed and taught by Dr. Barbara Des Rochers and Dr. Marina Bear (Bioethicist) as an important and critical part of the biotechnology program. A reader for the course was developed and is still in use, although the articles and topics have been updated. Issues presented in this course include a range of medical and environmental topics such as human experimentation, end of life decisions, use of recombinant DNA in medicine and agriculture and unethical practices in scientific research. The addition of material covering the use of stem cells is most appropriate.

(4) Other Courses offered outside of BCC

1. **Stem Cell Techniques Course**, *University of California, San Francisco*. Training includes.....
2. **Bioengineering 98: Stem Cells: Science and Society**, *University of California, Berkeley*. Topics covered in this course include types of stem cells,

Comments: The Bioengineering 98 is overseen by Dr. Irina Conboy. The cost of these two classes will be covered in the \$5000/trainee allowed by the grant.

(5) Integration of stem cell biology and the biotechnology offerings at BCC

For both the degree and the certificate, students can select to specialize in stem cell biology within the program. The *Specialty in Stem Cell Biology* will involve completion of the following:

- a. Stem Cell Techniques course offered by UCSF
- b. Biology 230C: Advanced techniques in cell manipulation

- c. Bioengineering 98: *Stem Cells: Science and Society*
- d. 9-month Internship in a host laboratory
- e. Participation in seminars and retreats offered by the host institution

(Note: The UC course *Stem Cells: Science and Society* will offer a more focused and in-depth look at the issues pertaining to stem cells, as opposed to a general bioethics course that will cover a range of topics; thus, it is appropriate that students specializing in stem cell biology enroll in the course at UC).

Available Enhancement Activities

Students in the *Specialty in Stem Cell Biology* and serving as interns at CHORI and UCB will have the opportunity to participate in a number of seminars, symposia and retreats centered on all aspects of stem cell science. Among the opportunities are the Fellows Conference that meets weekly to discuss basic, translational and clinical research, numerous seminars offered by the Berkeley Stem Cell Center, the Berkeley Stem Cell Center's annual retreat at Asilomar, CA symposia that tackle the scientific, bioethical and legal aspects of stem cells and participation in the Bay Area Stem Cell Club.

Available Research Laboratories

Laboratories at CHORI and UCB engaged in stem cell research and willing to participate in the Bridges to Stem Cell Research Program span the disciplines of molecular biology, bioengineering, material science engineering and integrative biology. A table is included in the Trainee Selection reflects the breadth and choices available to the trainee. Hippocampal neurogenesis, olfactory neurogenesis, angiogenesis, telomerase and adult stem cells, cord blood transplantation, gene targeting and stem cell engineering are among the many research endeavors available. In all, there are over 60 laboratories between the two institutions engaged in stem cell related research and thus far 30 have agreed to participate.

Trainee Selection and Placement

Selection for participation in the *Specialty in Stem Cell Biology* will be based upon the following parameters:

1. Genuine interest in stem cell biology
2. Laboratory skills
3. Reading and writing skills
4. Completion of one advanced class: immunology or genetics
5. Grades
6. Acceptance by the host laboratory

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Mentoring and Trainee Assessment (up to 1 page. Excess pages will be discarded)

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