San Diego State University
Summer 2011
Bridges / Pre-Marc
Day-to-Day Laboratory Activities
<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
</tr>
</thead>
</table>
| Week 1     | **Lecture:** Recording adult and neonatal heart cell contractility  
**Lecturer:** David Torres Barba  
**Room:** LS 218                                                                                                                                                                                                                                               | **Lecture:** Cardiovascular system; structure of the heart; excitation pathway; the EKG  
**Lecturer:** Myrna J. Martinez  
**Room:** LS 218                                                                                                                                                                                                                                                              | **Lecture:** Neocytocyte contractility by David T.B.  
**Room:** Microscopy room  
**Lab #1:** Cell contractility  
**S.L.:** Cell Statistics by Esteban V.H.  
**Room:** LS-218  
**Lab #2:** siRNA Transfection  
**S.L.:** Alex Chavez  
**Room:** LS-316  
**Lab #1:** Neonatal cardiocyte preparation and cell statistics  
**S.L.:** Contractility by David T.B.  
**Room:** LS-318  
**Lab #1:** Cell contractility  
**Room:** LS-218  
**Lab #2:** siRNA Transfection  
**S.L.:** Transfection by Alex Chavez  
**Room:** LS-316  
**Lab #1:** Calcium Trans by David T.B.  
**Room:** LS-218  
**Lab #1:** Calcium measurement  
**Room:** Microscopy room  
**Lab #2:** Analyze and graph contractility data using excel  
**Room:** LS-218 | **Lecture:** The heart during exercise; heart disease: risk factors; diagnostic methods; therapies.  
**Lecturer:** Myrna J. Martinez  
**Room:** LS 218  
**Lab #1:** Prepare culture media  
**Room:** LS-218  
**Lab #2:** Solution preparation; LB/carb plate preparation  
**Room:** LS-316 | **Lecture:** The heart as a pump; heart performance; blood pressure  
**Lecturer:** David Torres Barba  
**Room:** LS 218  
**Lab #1:** Neonatal cardiocyte preparation and cell statistics  
**S.L.:** Cell Statistics by Esteban V.H.  
**Room:** LS-218  
**Lab #2:** Pipette, pH meter; balance  
**Room:** LS-218 | **Lecture:** Fluorescence-Activated Cell Sorting (FACS) (Roland)  
**Room:** TBD  
**Lab:** Separating myocardial cells (myocytes, fibroblasts, etc.)  
**Room:** TBD | **Lecture:** Cardiac muscle mechanics  
**Lecturer:** Esteban Vazquez-Hidalgo  
**Room:** LS-218  
**S.L.:** Transformation by William Menjivar  
**Lab #1:** Transform E. coli and plate  
**Room:** LS-218  
**S.L.:** Western Blot by Myrna J. Martinez  
**Lab #2:** Western Blot  
**Room:** LS-218 | **Lecture:** Genome expression studies using microarrays  
**Lecturer:** Genaro Hernandez  
**Room:** LS-218  
**Lab #1:** Overnight E.coli T-streaking  
**Room:** LS-316  
**Lab #2:** Calcium data analysis  
**Room:** LS-218  
**Lab #3:** Western Blot  
**Room:** LS-218 | **Lecture:** A quick introduction to computer modeling  
**Lecturer:** David Torres Barba  
**Room:** LS-218  
**Lab #1:** Pour agarose gel; Lyze E. coli; extract plasmid DNA;  
**Lab #2:** Plasmid restriction digest  
**Room:** LS 316 | **Lecture:** Principles of PCR and qPCR  
**Lecturer:** Esteban Vazquez-Hidalgo  
**Room:** LS-218  
**Lab:** Analyze and graph contractility data using Matlab  
**Room:** EBA 110 | **Lecture:** Stem cells, tissue regeneration, therapies  
**Lecturer:** Dr. Ricardo Zayas  
**Room:** TBD | **Lecture:** Medical training vs doctoral degree programs and their costs  
**Lecturer:** Dr. Paul Paolini  
**Room:** LS 218 | **Lab:** Cardiac cell differentiation, myosin-actin assembly  
**Room:** TBD | **Lab:** Q-PCR  
**Room:** LS-316 |
What will I learn during the next six weeks?

• Lectures -
  • Recording and assessing adult & neonatal cardiocyte contractility
  • Cardiovascular system; structure of the heart
  • The heart as a pump; heart performance; blood pressure
  • The heart during exercise; heart disease: risk factors
  • Cardiac muscle mechanics
  • Genome expression studies using microarrays
  • A quick introduction to computer modeling
  • Principles of PCR and qPCR
  • Medical training vs. doctoral degree training programs and their costs

• Basic techniques -
  Pipetting, Balance, pH meter, Solution Preparation, Dilutions

• Cardiomyocyte -
  • Neonatal cardiomyocyte preparation; Cell viability determination;
  • Gene silencing; western blots; RT-PCR; PCR
  • Record and analyze cardiomyocyte contractility;
  • Record and analyze calcium transient in cardiomyocytes.

• Microbiology - Studies on E.coli
  • Prepare LB/carb Plates;
  • Transform E.coli and plate;
  • Toothpick Inoculation of E. coli;
  • Lyse E.coli.; Extract plasmid DNA;
  • Evaluate DNA concentration;
  • Plasmid restriction digest;

• Special Lectures and Labs -
  Dr. Ricardo Zayas
  Stem cells, tissue regeneration, therapies;
  Cardiac cell differentiation, myosin-actin assembly;

  Dr. Roland Wolkowics
  Lecture: Fluorescence-activated cell sorting (FACS)
  Lab: Separating myocardial cell (myocytes, fibroblasts, etc.)
### Week 1 day 1
**Group A**
*(Bridges Group A + Pre-Marc Group A)*

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A</th>
<th>Pre-Marc Group A</th>
</tr>
</thead>
</table>
| 1:00-1:30 pm  | **Lab:** Neonatal cardiocyte preparation observation  
**Room:** LS 316  
Students will observe part of the neonatal cardiocyte preparation. Cardiocytes will be isolated for future laboratory experiments. |                                                                                   |
| 1:30-2:30 pm  | **Lecture:** Lecture: Recording adult and neonatal heart cell contractility.  
**Lecturer:** David Torres Barba;  
**Room:** LS 218  
**Lecture Overview** – The lecture will provide an introduction to one of the main topics of study in our research laboratory. We will cover the function, general structure, and usefulness of the neonatal and adult cardiocyte model in cardiovascular research. The lecture will cover cardiocyte contractility recording and assessment methods. |                                                                                   |
| 2:30-3:00 pm  | **Lab:** Procedure of Neonatal cardiocyte -  
**Room:** LS 218 - Continue observation of neonatal cardiocyte preparation. |                                                                                   |
| 3:00-3:30 pm  | **Mini-Lecture:** Cell viability determination  
**Lecturer:** Esteban Vazquez-Hidalgo  
**Room:** LS 316  
**Lab:** Pipette and balance Lab;  
PH meter;  
**Room:** LS 218 |                                                                                   |
| 3:30-4:30 pm  | **Lab:** Pipette and balance Lab;  
PH meter.  
**Room:** LS 218  
**Mini-Lecture:** Cell viability determination  
**Lecturer:** Esteban Vazquez-Hidalgo  
**Room:** LS 316 |                                                                                   |

Lab equipment: (6X) Pipettes; (2X) Balance; (2X) pH meter; Microscope  
Lab reagents: Reagents for Neonatal preparation.
### Week 1 - Day 2
#### Group B
(Bridges Group B + Pre-Marc Group B)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group B</th>
<th>Pre-Marc Group B</th>
</tr>
</thead>
</table>
| 1:00-2:00 pm | **Lecture:** Recording adult and neonatal heart cell contractility.  
**Lecturer:** David Torres Barba;  
**Room:** LS 218  
**Lecture Overview** – The lecture will provide an introduction to one of the main topics of study in our research laboratory. We will cover the function, general structure, and usefulness of the neonatal and adult cardiocyte model in cardiovascular research. The lecture will cover cardiocyte contractility recording and assessment methods. | |
| 2:00-2:30 pm | **Short Lecture on Contractility Measurement**  
**Lecturer:** David Torres Barba  
**Room:** LS-218  
The short lecture will cover neonatal cardiocyte contractility, its characteristics and the common methods employed in our laboratory to assess neonatal cardiocyte function. | |
| 2:30-3:00 pm | **Short Lecture on siRNA**  
**Lecturer:** Alex Chavez  
**Room:** LS-316  
The short lecture will cover the basic theory of siRNA technologies. The lecture will cover the basis of siRNA and the way in which the technology is employed in our laboratory studies. | |
| 3:00-4:30 pm | **Lab:** Cell Contractility  
**Room:** Microscopy room  
4 wells with 0.5X10⁶ cells per well  
**L.I:** David Torres Barba | **Lab:** siRNA Transfection  
**Room:** LS-316  
8 wells with 1.0X10⁶ cells per well  
**L.I:** Xian Zhang |

Lab equipment: PTI system for calcium transient measurements  
Lab reagents: Reagents for siRNA: TransMessenger Reagent; siRNA.
### Week 1 - day 3

**Group A**  
(Bridges Group A + Pre-Marc Group A)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A</th>
<th>Pre-Marc Group A</th>
</tr>
</thead>
</table>
| 1:00-2:00 pm    | **Lecture**: Cardiovascular system; structure of the heart; excitation pathway; the EKG  
Lecturer: Myrna J. Martinez  
Room: LS-218  
**Lecture Overview** – The lecture will introduce the cardiovascular system by covering the main components of the system their characteristics and function. The lecture will cover the fundamental physical, chemical and electrical characteristics of the cardiovascular system.  |  |
| 2:00-2:30 pm    | Short Lecture on Contractility Measurement  
**Lecturer**: David Torres Barba  
Room: LS-218  
The short lecture will cover neonatal cardiocyte contractility, its characteristics and the common methods employed in our laboratory to assess neonatal cardiocyte function. |  |
| 2:30-3:00 pm    | Short Lecture on siRNA  
**Lecturer**: Alex Chavez  
Room: LS-316  
The short lecture will cover the basic theory of siRNA technologies. The lecture will cover the basis of siRNA and the way in which the technology is employed in our laboratory studies. |  |
| 3:00-4:30 pm    | **Lab**: Cell contractility  
**L.I**: David Torres Barba  
**Room**: Microcopy room  
4 wells X 0.5 X10^6 cells per well | **Lab**: siRNA Transfection  
**L.I**: Xian Zhang  
**Room**: LS-316  
8 wells X 1X10^6 cells per well |

Lab equipment: PTI system for calcium transient measurements
Lab reagents: Reagents for siRNA: TransMessenger Reagent; siRNA;...
Week 1 - day 4  
Group A  
(Bridges Group A + Pre-Marc Group A)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A</th>
<th>Pre-Marc Group A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00-2:00 pm</td>
<td><strong>Lecture:</strong> Cardiovascular system; structure of the heart; excitation pathway;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the EKG</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lecturer:</strong> Myrna J. Martinez</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Room:</strong> LS-218</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lecture Overview</strong> – The lecture will introduce the cardiovascular system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>by covering the main components of the system, their characteristics, and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>function. The lecture will cover the fundamental physical, chemical and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>electrical characteristics of the cardiovascular system.</td>
<td></td>
</tr>
<tr>
<td>2:00-2:30 pm</td>
<td><strong>Short Lecture on Calcium Measurements</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lecturer:</strong> David Torres Barba</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Room:</strong> LS-316</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The short lecture will cover the calcium transient and its function in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cardiocyte contractility its activation of the contractile filaments.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The short lecture will cover the basis of the technologies implemented to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>quantify the contractile signal.</td>
<td></td>
</tr>
<tr>
<td>2:30-4:30 pm</td>
<td><strong>Lab:</strong> Analyze and Graph Contractility Data Using Microsoft Excel</td>
<td><strong>Lab:</strong> Calcium Transient Measurements</td>
</tr>
<tr>
<td></td>
<td><strong>L.I:</strong> David Torres Barba</td>
<td><strong>L.I:</strong> Xian Zhang</td>
</tr>
<tr>
<td></td>
<td><strong>Room:</strong> LS-218</td>
<td><strong>Room:</strong> Microscopy Room</td>
</tr>
<tr>
<td></td>
<td>3 Students at a time, with 30-minute treatment with fluo-3.</td>
<td>3 Students at a time, with 30-minute treatment with fluo-3.</td>
</tr>
</tbody>
</table>

Calcium measurements will be performed in the Microscopy room with 3-4 students a time. Four wells with 0.5 X10⁶ cells per well will be prepared.

Students not participating in the treatment with Fluo-3 or with the calcium transient measurements will be working on the analysis and graphing of contractility data in room LS 218. Two students will be assigned per group working in this exercise.

Lab equipment: PTI system; (2X) Chamber; (6X) Computer installed with excel. Lab reagents: Fluo-3;
### Week 2 - day 1

**Group A**

*(Bridges Group A + Pre-Marc Group A)*

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A</th>
<th>Pre-Marc Group A</th>
</tr>
</thead>
</table>
| 1:00-2:00 pm  | **Lecture:** The heart as a pump; heart performance; blood pressure  
**Lecturer:** David Torres Barba  
**Room:** LS 218  
**Lecture Overview** – The lecture will introduce the heart as a pump and will cover heart performance, blood pressure and the most common methods to assess the function of the heart. |                                                            |
| 2:00-3:15 pm  | **Lab:** Prepare the NaOH and HCl  
Prepare culture media  
**L.I:** David Torres Barba  
**Room:** LS-218 | **Lab:** Prepare LB/Carb plates  
**L.I:** Xian Zhang  
**Room:** LS-316 |
| 3:15-4:30 pm  | **Lab:** Prepare LB/Carb plates  
**L.I:** Xian Zhang  
**Room:** LS-316 | **Lab:** Prepare the NaOH and HCl;  
Prepare culture media  
**L.I:** David Torres Barba  
**Room:** LS-218 |

Lab equipment: Microwave; (2X) Balance;  
Lab reagents: LB, Agar; Chemicals for culture media, NaOH, HCl
### Week 2 - day 2
#### Group A
(Bridges Group A + Pre-Marc Group A)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group B</th>
<th>Pre-Marc Group B</th>
</tr>
</thead>
</table>
| 1:00-1:30 pm  | **Lab:** Neonatal cardiocyte preparation observation  
**Room:** LS 316  
Students will observe part of the neonatal cardiocyte preparation. Cardiocytes will be isolated for future laboratory experiments. |                                                                                 |
| 1:30-2:30 pm  | **Lecture:** The heart as a pump; heart performance; blood pressure  
**Lecturer:** David Torres Barba  
**Room:** LS 218  
**Lecture Overview** – The lecture will introduce the heart as a pump and will cover heart performance, blood pressure and the most common methods to assess the function of the heart. |                                                                                 |
| 2:30-3:00 pm  | **Lab:** Procedure of Neonatal cardiocyte  
**Room:** LS 218  
- Continue observation of neonatal cardiocyte preparation. |                                                                                 |
| 3:00-3:45 pm  | **Lab:** Cell viability determination  
**Short Lecture:** Esteban Vazquez-Hidalgo  
**Room:** LS 316 | **Lab:** Pipette and balance; PH meter.  
**L.I:** David Torres Barba  
**Room:** LS 218 |
| 3:45-4:30 pm  | **Lab:** Pipette and balance; PH meter.  
**L.I:** David Torres Barba  
**Room:** LS 218 | **Lab:** Cell viability determination  
**Short Lecture:** Esteban Vazquez-Hidalgo  
**Room:** LS 316 |

Lab equipment: (6X) Pipette; (2X) Balance; (2X) pH meter; Microscope  
Lab reagents: Reagents for Neonatal preparation.
# Week 2 - day 3
## Group A
(Bridges Group A + Pre-Marc Group A)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A</th>
<th>Pre-Marc Group A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00-2:00 pm</td>
<td><strong>Lecture</strong>: The heart during exercise; heart disease; risk factors; diagnostic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>methods; therapies</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lecturer</strong>: Myrna J. Martinez</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Room</strong>: LS-218</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lecture Overview</strong> – The lecture will introduce heart function during</td>
<td></td>
</tr>
<tr>
<td></td>
<td>exercise. The different heart diseases and risk factors affecting heart</td>
<td></td>
</tr>
<tr>
<td></td>
<td>function will be covered along with the most common diagnostic methods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and therapies applied to improve heart function.</td>
<td></td>
</tr>
<tr>
<td>2:00-2:30 pm</td>
<td><strong>Short Lecture on Calcium Measurements</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lecturer</strong>: David Torres Barba</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Room</strong>: LS-316</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The short lecture will cover the calcium transient and its role in cardiocyte</td>
<td></td>
</tr>
<tr>
<td></td>
<td>contractility and the activation of contractile filaments. The short lecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>will cover the basis of the technologies implemented to quantify the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>contractile signal.</td>
<td></td>
</tr>
<tr>
<td>2:30-4:30 pm</td>
<td><strong>Lab</strong>: Analyze and Graph Contractility Data Using Microsoft Excel</td>
<td><strong>Lab</strong>: Calcium Transient Measurements</td>
</tr>
<tr>
<td></td>
<td><strong>L.I.:</strong> David Torres Barba</td>
<td><strong>Room</strong>: Microscopy Room</td>
</tr>
<tr>
<td></td>
<td><strong>Room</strong>: LS-218</td>
<td>4 Students at a time, with 30-minute treatment with fluo-3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>L.I.:</strong> Xian Zhang</td>
</tr>
</tbody>
</table>

Calcium measurement will be performed in the Microscopy room with 3-4 students a
time. Four wells with 0.5 X10^6 cells per well will be prepared.

Students not participating in the treatment with Fluo-3 or with the calcium transient
measurements will be working on the analysis and graphing of contractility data in room
LS 308. Two students will be assigned per group working in this exercise.

Lab equipment: PTI system; (2X) Chamber; (6X) Computer installed with excel.
Lab reagents: Fluo-3.
### Week 2 - day 4

**Group A**

*(Bridges Group A + Pre-Marc Group A)*

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A</th>
<th>Pre-Marc Group A</th>
</tr>
</thead>
</table>
| 1:00-2:00 pm | **Lecture:** The heart during exercise; heart disease; risk factors; diagnostic methods; therapies  
**Lecturer:** Esteban Vazquez-Hidalgo  
**Room:** LS-218  
**Lecture Overview** – The lecture will introduce heart function during exercise. The different heart diseases and risk factors affecting heart function will be covered along with the most common diagnostic methods and therapies applied to improve heart function. |                                                                                        |
| 2:00-3:00 pm | **Lab:** Prepare the NaOH and HCl; Prepare culture media  
**Room:** LS-218  
**L.I:** David Torres Barba | **Lab:** Prepare LB/Carb plates;  
**Room:** LS-316  
**L.I:** Xian Zhang |
| 3:00-4:30 pm | **Lab:** Prepare LB/Carb plates  
**Room:** LS-316  
**L.I:** Xian Zhang | **Lab:** Prepare the NaOH and HCl; Prepare culture media  
**Room:** LS-218  
**L.I:** David Torres Barba |

**Lab equipment:** Microwave; (2X) Balance.  
**Lab reagents:** LB, Agar; Chemicals for culture media, NaOH, HCl

---

**Week 3 – Days 1 & 2**

HOLIDAY
NOTE: From week 3 onward groups A and B will have the same lectures and labs

**Week 3 – Days 3 & 4**
Group A / B
(Bridges Group A / B + Pre-Marc Group A / B)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A / B</th>
<th>Pre-Marc Group A / B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00-4:30 pm</td>
<td><strong>Lecture:</strong> Fluorescence-Activated Cell Sorting (FACS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lecturer:</strong> Dr. Roland Wolkowicz</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Laboratory Exercise:</strong> Separating myocardial cells (myocytes, fibroblasts, etc)</td>
<td></td>
</tr>
</tbody>
</table>

**Week 4 – Day 1 / 2**
Group A / B
(Bridges Group A / B + Pre-Marc Group A / B)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A / B</th>
<th>Pre-Marc Group A / B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00-2:00 pm</td>
<td><strong>Lecture:</strong> Cardiac muscle mechanics</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lecturer:</strong> Esteban Vazquez-Hidalgo</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Room:</strong> LS-218</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Lecture Overview</strong> – The lecture will introduce the mechanical aspects of muscle contraction. The topics covered include muscle structure and function and the contribution of cardiocyte function to muscle mechanics.</td>
<td></td>
</tr>
<tr>
<td>2:00-2:50 pm</td>
<td><strong>Lab:</strong> Western Blot running gel – <strong>Room:</strong> LS-218</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Mini-Lecture:</strong> Myrna J. Martinez</td>
<td></td>
</tr>
<tr>
<td>2:50-3:30 pm</td>
<td><strong>Lab:</strong> Transform E. coli and plate – <strong>Room:</strong> LS-218</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Mini-Lecture:</strong> William Menjivar</td>
<td></td>
</tr>
<tr>
<td>3:30-4:30 pm</td>
<td><strong>Lab:</strong> Western Blot transfer – <strong>Room:</strong> LS-218</td>
<td></td>
</tr>
</tbody>
</table>

Lab equipment: (2X) XCellIII™ Blot Module

Lab reagents: NuPAGE Tris-Acetate SDS Running Buffer; NuPAGE Novex 3-8% Tris-Acetate Pre-Cast Gel; 1X NuPAGE® Transfer Buffer using the NuPAGE® Transfer Buffer (20X); XL-1 Blue sub-cloning grade competent cells, plasmid DNA, LB medium.
## Week 4 - day 3 / 4

**Group A / B**  
*(Bridges Group A / B + Pre-Marc Group A / B)*

<table>
<thead>
<tr>
<th>Time</th>
<th>Pre-Marc Group A / B</th>
<th>Pre-Marc Group A / B</th>
</tr>
</thead>
</table>
| 1:00-2:00 pm   | **Lecture:** Genome expression studies using microarrays  
**Lecturer:** Genaro Hernandez  
**Room:** LS 218  
**Lecture Overview** – The lecture will introduce microarray technologies. The lecture will cover the biological basis of gene expression studies, the technology implemented in microarrays and their use in research applications. |                                                                                      |
| 2:00-2:30 pm   | **Lab:** Western Blot secondary  
**Room:** LS-218  
**L.I:** David Torres Barba | **Lab:** E. coli overnight inoculation  
**Room:** LS-316  
**L.I:** Xian Zhang |
| 2:30-3:00 pm   | **Lab:** E. coli overnight inoculation  
**Room:** LS-316  
**L.I:** Xian Zhang | **Lab:** Western Blot secondary  
**Room:** LS-218  
**L.I:** David Torres Barba |
| 3:00-3:50 pm   | **Lab:** Calcium data analysis using excel  
David Torres Barba  
**Room:** LS-218 |                                                                                      |
| 3:50-4:30 pm   | **Lab:** Western blot development  
**Room:** LS-218  
**L.I:** Xian Zhang |                                                                                      |

**Lab equipment:** TBD

**Lab reagents:** TBD
### Week 5 – Day 1 / 2
#### Group A / B
(Bridges Group A / B + Pre-Marc Group A / B)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A / B</th>
<th>Pre-Marc Group A / B</th>
</tr>
</thead>
</table>
| 1:00-3:00 pm   | **Lab:** Extract plasmid DNA; Plasmid restriction digest; Pour and load agarose gel.  
**Room:** LS-218  
**L.I:** Xian Zhang and David Torres Barba |                      |
| 3:00-3:50 pm   | **Lecture:** A quick introduction to computer modeling  
**Lecturer:** David Torres Barba  
**Room:** LS-218  
**Lecture Overview** – The lecture will introduce the concept of computer modeling in the natural sciences and engineering. The lecture will cover the need for mathematical and computer modeling in the research laboratory and the methods commonly employed in the creation of mathematical and computer models. |                      |
| 3:50-4:30 pm   | **Lab:** Observe and cover the results of earlier activity.  
**Room:** LS-218  
**L.I:** Xian Zhang and David Torres Barba |                      |

Lab reagents: QIAprep Spin Miniprep Kit

### Week 5 – Day 3 / 4
#### Group A / B
(Bridges Group A / B + Pre-Marc Group A / B)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A / B</th>
<th>Pre-Marc Group A / B</th>
</tr>
</thead>
</table>
| 1:00-2:00 pm   | **Lecture:** Principles of PCR and qPCR  
**Lecturer:** Esteban Vazquez-Hidalgo  
**Room:** LS-218  
**Lecture Overview** – The lecture will introduce the basis of PCR and qPCR. The lecture will review the biological basis and theory of PCR and qPCR and the technology that is used in its implementation. The lecture will cover the applicability of this method in the research laboratory and particularly in our research studies. |                      |
| 3:00-4:30 pm   | **Lab:** Analyze and Graph Contractility Data Using Matlab  
**L.I:** David Torres Barba  
**Room:** EBA 110 |                      |
Week 6 – Day 1 / 2
Group A / B
(Bridges Group A / B + Pre-Marc Group A / B)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A / B</th>
<th>Pre-Marc Group A / B</th>
</tr>
</thead>
</table>
| 1:00-4:30 pm | **Lecture:** Stem cells, tissue regeneration, therapies  
**Lecturer:** Dr. Ricardo Zayas  
**Lab:** Cardiac cell differentiation, myosin-actin assembly  
**Room:** TBD |                      |

Week 6 – Day 3 / 4
Group A / B
(Bridges Group A / B + Pre-Marc Group A / B)

<table>
<thead>
<tr>
<th>Time</th>
<th>Bridges Group A / B</th>
<th>Pre-Marc Group A / B</th>
</tr>
</thead>
</table>
| 1:00-2:00 pm | **Lecture:** Medical Training vs. Doctoral degree training programs and their costs.  
**Lecturer:** Dr. Paul Paolini  
**Room:** LS-218  
**Lecture Overview** – The lecture will cover the most important aspects to consider when making a decision to apply to graduate school. The lecture will concentrate on the specific topic of doctoral and medical training. |                      |
| 3:00-4:30 pm | **Laboratory** - Q-PCR Experiment  
**L.I:** Xian Zhang and David Torres Barba  
**Room:** LS-316 |                      |