Medical School Anatomy Lab Body Donors as “Educators” of High School Students Pertaining to Health Behaviors and Preventable Disease

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Disclosures

No financial disclosures. This project is not currently funded.

Introduction: Recruiting the next generation

- Pipeline programs have been developed to encourage high school students to enter/explore medicine and science
- Medical Students can facilitate this recruitment

My AHA! moment

- Facilitating dissection lab at local high school (HS)
  - HS students study anatomy
  - Medical students (MS) learn anatomy
  - MS could teach anatomy
- AHA! – design a curriculum using cadavers with a focus on disease prevention

The Clinician Educator Pathway

- As a participant, I am required to:
  - Attend core sessions
  - Participate in activities that are focused on education
  - Create a scholarly project
- My project: Create a curriculum that facilitates HS student anatomy education and promotes recruitment into health sciences

Unique Project to Meet Goals

- Goals for HS students:
  - Expand understanding of anatomy and physiology
  - Reinforcing healthy behaviors
  - Increase awareness of disease prevention
- Goals for medical students
  - Provide opportunity for teaching
  - Enhance understanding of anatomy/prevention
  - Promote health sciences as a career choice
A Unique Project to Meet Goals

• Goals for MCW
  – Meet our mission:
    • “teach physicians/scientists of tomorrow”
    • “forge partnerships in education”
  – Maximize education value of body donors
    • Community exposure to the body donor program
  – Promote prevention

The Curriculum

• Tour of MCW
• Introductory Presentation to Anatomy Lab
• Anatomy Lab session, 3 stations:
  – Thorax
  – Abdomen
  – Extremities
• Medical Student Panel Q&A
• Lunch, and take-home materials distributed to share with family

MS preparation

• Volunteer MS provided with curriculum prior to session
• Instructor instructions:
  – Prioritize answering questions/student exploration
  – Use organs for comparison
  – Apply variety of teaching methods
    • Diagrams, demonstrations, etc.

Thorax Presentation ~ 20 mins

<table>
<thead>
<tr>
<th>Presentation of:</th>
<th>Est. Time:</th>
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<tbody>
<tr>
<td>1. Thorax overview</td>
<td>1 min</td>
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<tr>
<td>2. Heart introduction – main point for reference</td>
<td>3 mins</td>
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<tr>
<td>3. Overview of circulatory system &amp; quiz/questions</td>
<td>2 mins</td>
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<tr>
<td>4. Tie into lungs/present lungs</td>
<td>2 mins</td>
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<tr>
<td>5. Present great vessels &amp; esophagus</td>
<td>1 min</td>
</tr>
<tr>
<td>6. Compare healthy/diseased hearts, present and pose questions about unhealthy behaviors</td>
<td>3 mins</td>
</tr>
<tr>
<td>7. Compare healthy/diseased lungs, present and pose questions about unhealthy behaviors</td>
<td>3 mins</td>
</tr>
<tr>
<td>8. Prevention of CV and lung disease</td>
<td>2 mins</td>
</tr>
<tr>
<td>9. Present additional pathology if present and time/interest allows &amp;/OR answer questions/ID structures of your choosing</td>
<td>3+ mins</td>
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Abdomen Presentation ~ 20 mins

<table>
<thead>
<tr>
<th>Presentation of:</th>
<th>Est. Time:</th>
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<tbody>
<tr>
<td>1. Abdomen overview</td>
<td>1 min</td>
</tr>
<tr>
<td>2. Reinforce structures identified in fetal pig dissection</td>
<td>3 mins</td>
</tr>
<tr>
<td>3. Stomach introduction – point for reference</td>
<td>1 min</td>
</tr>
<tr>
<td>4. Overview of digestion/excretion (Stomach, Liver, Pancreas, Intestines) &amp; quiz/questions</td>
<td>3 mins</td>
</tr>
<tr>
<td>5. Overview of fluid excretion and blood filtration (Kidney, Liver, Spleen) &amp; quiz/questions</td>
<td>2 mins</td>
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<tr>
<td>6. Present great vessels</td>
<td>1 min</td>
</tr>
<tr>
<td>7. Compare healthy/diseased organs (Kidney, possibly Liver, Spleen, Pancreas, etc.), ID unhealthy behaviors</td>
<td>4 mins</td>
</tr>
<tr>
<td>8. Prevention of disease</td>
<td>2 mins</td>
</tr>
<tr>
<td>9. Present additional pathology if present and time/interest allows &amp;/OR answer questions/ID structures of your choosing</td>
<td>3+ mins</td>
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Extremities ~ 20 mins

<table>
<thead>
<tr>
<th>Presentation of:</th>
<th>Est. Time:</th>
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<tbody>
<tr>
<td>1. Arm overview – joints, orientation</td>
<td>1 min</td>
</tr>
<tr>
<td>2. Reinforce arm structures identified in fetal pig dissection</td>
<td>3 mins</td>
</tr>
<tr>
<td>3. Demonstrate action of flexors and extensors</td>
<td>2 mins</td>
</tr>
<tr>
<td>4. Overview role of muscles/ligaments/bones</td>
<td>1 min</td>
</tr>
<tr>
<td>5. Overview major arm nerves - macroscopic view</td>
<td>1 min</td>
</tr>
<tr>
<td>6. Leg overview – joints, orientation</td>
<td>1 min</td>
</tr>
<tr>
<td>7. Reinforce leg structures identified in fetal pig dissection</td>
<td>3 mins</td>
</tr>
<tr>
<td>8. Demonstrate adipose tissue vs. muscle, discuss how exercise builds muscle, and how fat accumulates (Q&amp;A)</td>
<td>2 mins</td>
</tr>
<tr>
<td>9. Prevention of disease/healthy behaviors/vessel health</td>
<td>3 mins</td>
</tr>
<tr>
<td>10. Prevent additional pathology if present/interest allows &amp;/OR Answer questions/ID structures of your choosing</td>
<td>3+ mins</td>
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Participation

• 2 sessions
  – 2012: 33 total HS students
  – 2013: 66 total HS students
• All participated in the tour and 3 stations
• Variable assessment tools
  – Learned from 1st session

Measuring Student Experience & Curriculum Effectiveness

• HS student experience:
  • Essay: review of experience (both sessions)
  • Reaction survey (1st session)
    • 1=definitely disagree, 5=definitely agree
  • HS faculty/chaperone survey

• MS experience:
  • MS instructor survey (first session)

• Curriculum effectiveness:
  • Pre- and Post-test (second session only)
  • Focus on anatomy understanding and integration with the effect of health behaviors on long term health

Qualitative Analysis of Essay: Reaction

• HS Students wrote they had
  – A “better understanding” (69%)
  – A “very positive experience” (63%)
  – “Questions answered” (25%)
  – An “amazing opportunity” (9%)

Other insights from Essay: Behavior

• Students stated project caused them to
  – Will/have shared learning with others (84%)
  – “influence health perception/choices” (50%)
  – “influence future career” (44%)

Survey: Students and Chaperones were very positive!

<table>
<thead>
<tr>
<th>Question (paraphrased):</th>
<th>Response (out of 5)</th>
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<tbody>
<tr>
<td>Lab experience reinforced what I learned in my HS Anat &amp; Phys</td>
<td>4.7</td>
</tr>
<tr>
<td>Visit to MCW makes me interested in expanding science learning</td>
<td>4.4</td>
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<tr>
<td>(for Juniors) I want to return next year</td>
<td>4.5</td>
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<tr>
<td>I would recommend this experience to my friends</td>
<td>4.6</td>
</tr>
<tr>
<td>I learned a lot from my medical student cadaver instructor</td>
<td>4.7</td>
</tr>
<tr>
<td>Dr. Hoagland (Anat prof.) got me excited to go into anatomy lab</td>
<td>4.6</td>
</tr>
<tr>
<td>This experience broadened my view of anatomy and enriched my understanding of anatomy</td>
<td>4.7</td>
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Survey results: Medical Students

Positive
  • Tour meaningful
  • Effective curriculum
  • Comprehensive guide
  • Flexibility to address questions
  • Participation was fun (100%)
  • Helped improve teaching skills (89%)
  • Reinforced anatomical knowledge (89%)

Improvements
  • Training session would be helpful
  • Recognized that teaching skills varied between students
Curriculum Effectiveness: Pre/Post test (done for 2nd session only)

Pre test
• Mean: 79% correct
• 5% achieved perfect score

Post test
• Mean: 93% correct
• 57% achieved perfect score

Conclusions
• A ½ day interactive, MS-facilitated session for HS students is feasible
  – Improves understanding of anatomy
  – Promotes sharing of lessons learned with others
  – Increases awareness of healthy behaviors
  – Provides MS with opportunity to teach
  – Enhances medical student knowledge of anatomy
  – Meets MCW missions
  – Maximizes value of body donors

Lessons Learned
• Designing curriculum can meet goals
  – For Clinician Educator Pathway
  – For HS students
  – For medical school
• Keep assessments consistent
• Provide enhanced instructor training

Future Directions
• Create dedicated instructor training materials AND reproducible curriculum for dissemination (MedEdPortal)
• Revise (minor) current stations
  – Add brain station
• Improve surveys and validate test

Future Directions
• Expand to other high schools
  – Partner with Student Affairs re: diversity goals
  – High School for the Health Sciences
• Consider follow up survey of original participants re: career plans

Thanks and Acknowledgements
• Drs. Todd Hoagland and Karen Marcdante
• MCW medical student volunteer instructors
• Jeff Houck (Nicolet High School)
• The body donors and their families – for their gracious gift.
References


2. Burns ER. Anatomy of a successful K-12 Educational Outreach Program in the Health Sciences: Eleven Years experience at one Medical Science Campus. The Anatomical Record (New Anat.) 2002; 269:181-193


Questions?
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