The Florida State University
College of Medicine

BMS 6115C

Clinical Anatomy, Embryology and Imaging

SUMMER
2011

Table of Contents

Instructors

Course Director

Lynn J. Romrell, Ph.D.
Professor and Associate Dean
Room 1110-L
lynn.romrell@med.fsu.edu

Faculty

Eric Laywell, Ph.D.
Associate Professor and
Assistant Course Director
eric.laywell@med.fsu.edu

James Cavanagh, M.D.
Associate Professor
jim.cavanagh@med.fsu.edu

Christopher Leadem, Ph.D.
Associate Professor and
Associate Dean of Student Affairs & Admissions
christopher.leadem@med.fsu.edu

Teaching Assistants

Anatomy

Mohammed Al-Humiari
Michael Dender
Andy Fritze
Alex Gaukhman
Tara Gonzalez
Angela Green
Kevin Himschoot
Jim Hughes
Lexie Mannix
Melissa McDole
Sweta Sengupta
Jessica Specht
Colin Swigler
Brett Thomas
Matt Welsh
Geden Franck (Extremities)
Laura Gingrich (Thorax, H&N)

Informatics

Tom Beardsley
Jens Flock
Darren Klawinski
Ben Robelo

Doctoring

Mariana Borges
Matt Heimann
Judy Lin
Samantha Rupert

Course Overview

Course Goals

Clinical Anatomy, Embryology and Imaging (BMS 6115C) is a 11 week long course and runs concurrently with the Doctoring 1 Course. The primary goal of the course is to provide the students with a basic understanding of the gross anatomy, embryology and radiologic imaging of the entire body. This knowledge serves as a foundation for the remainder of the student's medical education and future practice of medicine. Second, this course prepares students to apply their understanding of anatomy, embryology, and radiologic imaging as they gain insight into the pathophysiology of disease processes. Students are encouraged to utilize learning resources such as faculty, textbooks, journals and FSU-COM computer resources so that as long term learners the students are able take responsibility for their own continued educational development.

Competencies

FSUCOM – Competencies - Clinical Anatomy [BMS 6115C]		
Competency Domains	Competencies Covered in the Course	Methods of Assessment
Patient Care	X*	
Medical Knowledge	X	Written and practical exams and quizzes; NBME Subject Exam
Practice-based Learning	X*	
Communication Skills	X	Faculty and TA observation; Peer and self-evaluation within the assigned teams and during course activities.
Professionalism	X	Faculty and TA observation; Peer and self-evaluation within the assigned teams and during course activities.
System-based Practice		
NOTES: * Students observed physician-patient encounters during weekly "Grand Rounds." Faculty and other invited presenters model behavior expected during patient encounters. Students are encouraged to asked questions of the participating patients.		

Learning Objectives

The student will be able to:

Knowledge

1. Demonstrate a basic knowledge of normal anatomy, embryology, cross-sectional anatomy and radiologic imaging of the human body.
2. Apply anatomical knowledge to recognize and solve clinical problems.
3. Demonstrate knowledge of the anatomical differences in the human body from birth to senescence.
4. Recognize when one has reached the limits of their anatomical knowledge when trying to apply it to understanding clinical problems, and be able to utilize other resources to obtain needed information in a timely manner.
5. Recognize the anatomy and laboratory findings related to variations, pathology, previous surgery and human life cycle from gestation to the elderly patient.
6. Utilize a variety of resources (faculty, textbooks, computers, internet, etc.) to locate anatomic, embryologic, and/or radiologic information in order to understand how it relates to clinical problems.

Interpersonal skills and communication

7. Work together as a professional team in the anatomy laboratory and in small-group study sessions.
8. Engage in self-evaluation and evaluate peer performance during the laboratory and small-group experiences of the course.

Professionalism

9. Demonstrate professional values, attitudes and behavior in all your interpersonal interactions with faculty, staff and peers.

Course Format

Team Approach

The team approach is essential in this course, which has a major laboratory component. Medicine is a “team sport.” Appropriate care of patients requires the constant interactions of numerous members of the health care team. Most of us learn best when we share our knowledge with others – good teachers learn from those they teach.

The assigned laboratory teams are expected to work together on the clinical cases presented in lecture and to work as a team to

complete the assigned dissection in the laboratory. Students will utilize a variety of digital imaging programs that will supplement learning that occurs in the laboratory setting, lectures, small-group sessions and personal study time. As a side benefit, this course will introduce the student to anatomical terminology commonly used in medicine today. The anatomic knowledge gained during the course will be used in later courses in the curriculum.

Anatomy Laboratory

The laboratory experience will consist of highly interactive, small group activities designed to integrate structure identification with anatomical relationships and clinical significance. A significant portion of the course will be devoted to a dissection lab (four, two hour sessions per week). Student lab teams will be divided into a red and blue team. The red and blue teams will alternate every other day in taking responsibility for the dissections. The "dissecting" team will study the human cadaver, and the "non-dissecting" team will study cross-sectional imaging and radiology of the entire body by anatomical regions.

One member of each team (α and β) will be assign as the team captain for the week. At the end of the lab period (5:00 p.m.), the team captain for the dissecting team will meet with the entire non-dissecting team and review the dissection completed that day. All items identified in bold print in the dissection guide should be shown to the "non-dissecting" team. These daily meeting are essential so that the teams are ready to trade assignments each day.

The ability to recognize and understand anatomical relationships is essential in many aspects of the practice of medicine from performing a basic physical examination to the interpretation of radiographic images. The lectures, laboratory exercises, and independent study assignments will focus on the normal anatomy and common variations seen in the human body. Students are to work in their assigned teams as they study and review the material presented in the course. Exchange of information between the red and blue teams must occur so that all students are able to benefit from every laboratory assignment. The team members are responsible to see that the exchange of information occurs on a frequent basis.

Students not actively dissecting during lab hours and assigned to study osteology, radiology and/or cross-sectional anatomy can do so in the study room adjacent to the anatomy labs or in their respective community areas. The study room in the anatomy

laboratory is equipped with models, skeletons, computers, anatomy software, a computer and LCD projector. The anatomy laboratories and student study rooms are available to students 24 hours a day, seven days a week.

Lectures

Lecturers will focus the content on major anatomical concepts and introduce clinical presentations aimed at stimulating active student participation. The lectures are intended to be very interactive between students and faculty. In order for this type of dialogue to occur, the student must read the assigned material before attending a lecture in order to intelligently discuss issues or ask for clarification about a concept. The lecture is not intended to present all information; students are expected to study information in the assigned text to supplement material presented in the lectures. The textbooks will be the benchmark for the level of detail examined upon for each anatomical region. The radiology component of the course will focus on the recognition of anatomic structures using various radiologic techniques.

Weekly "Grand Rounds" — Clinical Presentation

Each week will end with a clinical presentation which is planned to emphasize anatomical concepts covered during the week. The material presented may be included on the examinations. These sessions will emphasize the importance of anatomy in developing a differential diagnosis in the treatment of patients.

DATE	TOPIC	PRESENTER
June 10th	Spine and Upper Extremity: "Shoulder Pain"	Jerry Latimer, P.T.
June 17th	Upper Extremity: "Pain and Swelling"	Marilyn Gordian, P.T., CLT
June 24th	Extremities: "Weakness in the Upper Extremity"	R. Watson, M.D.
June 24th	Extremities: "Shoulder Pain and Weakness"	A. Wong, M.D.
July 8th	Thorax, Heart and Lungs: "Shortness of Breath"	K. Brummel-Smith, M.D.
July 12th	Neck and Superficial Face	Barrett Tolley, D.D.S.
July 15th	Thorax: "Chest Pain"	C. Stine, M.D.
July 22nd	Head and Neck: "Nausea and Vertigo"	R. Watson, M.D.
July 29th	Abdomen: "Abdominal Pain"	J. Fogarty, M.D.
August 5th	Pelvis and Perineum: "Abdominal/Pelvic Pain"	M. Manting, M.D.
August 10th	"Pain and Weakness in the Lower Extremity"	R. Watson, M.D.

Radiology & Cross-sectional Imaging

The objective of the radiology cross-section component of the course is not to train radiologists. The objective is to enable students to apply their understanding of the anatomic relationship to interpret and recognize structures visualized by a variety of radiologic techniques.

The lab is equipped with an ultrasound unit. We will provide opportunities for all students to use an ultrasound unit to visualize anatomy on themselves and each other. This will be related to their anatomical study on the cadaver. Our goal is to provide a basic understanding of how ultrasound images are produced and how they compare to findings from dissections. Students will be able to download the imaging to share with students and faculty.

Self-Study

Blocks of time are planned each day for independent, self-directed use of faculty resources, educational materials such as videotaped demonstrations, interactive software, the Internet, and even textbooks. **RadSIM** (**rad**iology **s**elf **i**nstructional **m**odule) is a self instructional teaching module produce by Dr. Romrell and the Informatics TAs to enable the students to study and review basic anatomic radiology. This module is available on the course Blackboard site. It is a very popular and useful tool to assist students in their study.

Policies

Americans with Disabilities Act

Candidates for the M.D. degree must be able to fully and promptly perform the essential functions in each of the following categories: Observation, Communication, Motor, Intellectual, and Behavioral/Social. However, it is recognized that degrees of ability vary widely between individuals. Individuals are encouraged to discuss their disabilities with the College of Medicine's Director of Student Counseling Services and the FSU Student Disability Resource Center to determine whether they might be eligible to receive accommodations needed in order to train and function effectively as a physician. The Florida State University College of Medicine is committed to enabling its students by any reasonable means or accommodations to complete the course of study leading to the medical degree.

The Office of Student Counseling Services
Medical Science Research Building G146
Phone: (850) 645-8256 Fax: (850) 645-9452

This syllabus and other class materials are available in alternative format upon request. For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center
97 Woodward Avenue, South
Florida State University
Tallahassee, FL 32306-4167
Voice: (850) 644-9566
TDD: (850) 644-8504
sdrc@admin.fsu.edu
http://www.fsu.edu/~staffair/dean/StudentDisability

Academic Honor Code

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. (Florida State University Academic Honor Policy, found at http://www.fsu.edu/~dof/honorpolicy.htm.

Attendance Policy

The College of Medicine has detailed attendance policies as they relate to each cohort and events that conflict with course schedules. See pages 27-29 of *FSUCOM Student Handbook* for details of attendance policy, notice of absences and remediation.

Required/Recommended Materials

Title, Publisher, ISBN	Authors	Edition	Required/ Optional
Clinically Oriented Anatomy, Sixth Edition, Lippincott Williams and Wilkins, ISBN-13: 978-0-7817-7525-0	Moore, Keith, L., Dalley, Arthur F. and Agur, Anne, M. R.	6th 2009	Required
Grants Dissector, Lippincott, Williams & Wilkins, ISBN: 9780781774314	Tank, Patrick W.	14th 2008	Required
Langman's Medical Embryology, Lippincott Williams and Wilkins, ISBN: 978-0-7817-9069-7	Sadler, T. W.	11th 2009	Required
Imaging Atlas of Human Anatomy, Mosby, ISBN: 9780723432111	Weir, J., and Abrahams, P.H.	3rd August 2005	Required
Choose one of the following atlases:			
(a) Grant's Atlas of Anatomy, Lippincott, Williams & Wilkins, ISBN: 9780781770552	Agur, A.M.R. and Lee, M.J.	12th 2008	More "accurate" illustrations
(b) Atlas of Human Anatomy, Icon Learning Systems/Elsevier, ISBN: 9781416033851	Netter, F.H.	4th 2008	Most popular among students
(c) Color Atlas of Anatomy: A Photographic Study of the Human Body, Lippincott, Williams & Wilkins, ISBN: 9780781790130	Johannes W. Rohen, Chihiro Yokochi and Elke Lutjen-Drecoll	7th 2011	Color photographic atlas

(d) Atlas of Anatomy, Thieme, ISBN: 978-1-60406-062-1	Gilroy, A.M., MacPherson, B.R. and Ross, L.M.	2008	Excellent illustrations
Other reference texts recommended, but not required			
McMinn's Clinical Atlas of Human Anatomy with DVD, 6th Edition, Elsevier Science Limited, ISBN: 978032303654	Abrahams, P.H., Johannes Boon, and Jonathan Pratt	6th 2008	Color photographic atlas

Other required items for the course

- dissecting kit (optional – we supply basic tools)
- lab coat or scrubs
- eye protection – this can be glasses or safety glasses

Optional items – Plastic apron

Latex gloves - Provided

Grading

The table below indicates the relative weightings for the components. A maximum of 560 points is possible.

Assessments

Component	Total Points Possible
Written Unit Exams (60 questions each)	
Unit 1 – Extremities and Back	60
Unit 2 – Thorax and Head/Neck	60
Unit 3 – Abdomen and Pelvis	60
Laboratory Exams (60 questions each)	
Unit 1 – Extremities and Back	60
Unit 2 – Thorax and Head/Neck	60
Unit 3 – Abdomen and Pelvis	60
Mid-Unit Quizzes (20 questions each written and practical)	
Unit 1 – Extremities and Back	40
Unit 2 – Thorax and Head/Neck	40
Unit 3 – Abdomen and Pelvis	40
NBME Subject examination	80
TOTAL	**560**

Each student's correct scores on all examinations and quizzes will be totaled to give a total correct score. This score will be divided by the possible points throughout the course to produce an overall percent correct in the course. The course director and faculty may drop questions, if they are determined to be flawed or inappropriate.

Grading scale

Grade	Percentage
PASS	> 70%
FAIL	<70%

Important grading issues

To pass the CA course, students must make at least 70% overall in the course.

Scores will be reported within 24 hrs of each assessment exercise. These scores provide you with information to assess your progress. The level of performance on the internal examination provide a good estimate of the performance level which can be expected on national examination, such as NBME Subject Examinations and the USMLE (see below).

You are encouraged to achieve a solid level of competence in your medical knowledge. You are responsible to develop learning habits which will enable you to be a "life-long learner." You should attain the ability to continue to build your knowledge and understanding of mechanism of disease and health so you can provide your future patients with the highest quality of care possible through your own actions or by referring them to health care specialist with greater knowledge than your own.

Written and Practical Examinations

Quizzes

There will be three quizzes, which will occur at approximately the mid-point of each unit. The quizzes will include a written and practical component. For the practical, students will work independently and then as dissection teams to identify the structures on the cadavers and radiographic images.

Unit Exams

The unit examinations are 24% of the value of the final grade. The unit examinations include both a written and laboratory practical component. The two components are of equal value. Two components (written and practical) are given on the same day; both components have 60 test items. The written examination questions will be simple multiple-choice questions (select the best answer). Many written questions will emphasize the clinical application of anatomy and will often be based on clinical scenarios. Information from all course activities is considered testable material for the written exams. The unit examination will not have questions from previous units.

Students will NOT be allowed to keep their unit examinations. The unit examinations are not comprehensive; they focus on the material presented within the region of the body being studied in that unit. The approximate percentages for the sources of the written exam questions are as follows:

Lecture-guided topics and clinical presentations, 75-85%
Assigned reading not lectured upon, 5-10%
Integration of X-sectional and radiographic anatomy, 5-10%

Quizzes

There will be three quizzes, which will occur at approximately the mid-point of each unit. The quizzes will include a written and practical component. For the practical, students will work independently and then as dissection teams to identify the structures on the cadavers and radiographic images.

NBME Subject Examination

This is a **comprehensive** examination testing knowledge in anatomy and embryology. These are national examination prepared by the National Board of Medical Examiners (NBME). The questions on the NBME Subject Examinations are written by medical educators selected for their competence in the various medical disciplines. The subject examinations assess the knowledge and understanding of concepts expected in general of medical students trained in the US and Canada. The percentile scores reported on the NBME Subject Examinations give you an indication of your level of achievement within our courses and provide you with the opportunity to assess your knowledge relative to students from other medical schools. This examination will count for 16% of the final grade. Your score on the NBME Subject Examination also gives you insight to the material being assessed on the United State Medical Licensing Examinations (USMLE).

Laboratory Assessment

Laboratory Unit Exams

The primary evaluation of the student's anatomical knowledge over the laboratory activities will be through three unit practical examinations during the course. The practical examinations consist of 60 questions consisting of basic identification and association type questions. Approximately 40 structures are tagged on the cadavers, models and skeletons, and the content level is comparable to most of the BOLDED TEXT structures in the dissector. About 10 questions will test knowledge about normal radiology and cross-sectional anatomy. The practical examinations are not comprehensive.

Evaluation of teamwork of in lab activities

You will complete self and peer-evaluations within the assigned groups in the laboratory. These assessments will give each team member the opportunity to give and receive constructive feedback. This information will be used in the assessment of your competence in communication skills.

Anatomy Laboratory
Rules and Protocol - 2011

Vesalius' Fabrica 1543

Protocol for the FSU-COM Human Anatomy Laboratory

Dr. Lynn Romrell is the former Executive Director (served for 25 years) and is currently the representative of Florida State University College of Medicine on the Anatomical Board of the State of Florida. As a member of the Anatomical Board, he is responsible to ensure that dignity is always shown for the remains of the individuals who will their bodies to the State of Florida for the education of medical students and other students in the health care disciplines.

Lab activity

1. Access. The anatomy lab will be open 24 hours a day, 7 days a week during the semester. After hours, the anatomy lab can be accessed by the card reader.

2. All students, faculty and approved guests must sign “Pledge of Respect” form.

3. Authorized Personnel. Only COM medical students, faculty and other health-related personnel and facility workers are permitted access to the lab. FSU badges are the best form of I.D. All unauthorized persons will be told to leave immediately. After scheduled course hours, campus police regularly patrol the area and will escort trespassers from the lab and report the person(s) responsible for the unauthorized entry to appropriate authorities for corrective purposes. Immediate family members and health-oriented guests of medical students must first receive authorization from Dr. Romrell before being allowed entry into the lab. The lab doors should not be opened for anyone "knocking" other than for an authorized person (i.e. student forgetting their card). Visitation is **NOT** permitted during scheduled dissection periods. During any visit of authorized guests, they should avoid all opened cadaver tanks. Minors will NOT be admitted except as part of an organized tour. It is the responsibility of all authorized personnel, faculty and students, to enforce these rules. It is the LAW that donors to the Florida Anatomical Board are guaranteed the respect and confidentiality in the spirit by which their gift was donated to our institution. Any disrespect to the cadavers will be dealt with accordingly.

4. According to Florida law, removal of any cadaver parts, whatsoever, from the laboratory is a crime of grave robbery.

5. NO photographs are to be taken of the cadavers or anything in the laboratory, except for images necessary for cadaver autopsy reports.

6. NO eating, drinking or smoking is allowed in the laboratory or amphitheater.

7. NO radios or tape players are allowed in the laboratory, unless used with earphones.

8. Personal protection in the lab:

   - Do not wear sandals or open toe shoes in the lab.
   - Recommend wearing scrubs or lab coats. Some prefer an additional plastic apron for protection from fluids.
   - Recommend wearing of gloves.
   - Wear glasses or protective goggles.
   - Material Safety Data Sheets of chemicals used in the laboratory are available in the lab.
   - Use dust mask when using electric bone saws.

9. First aid for cuts in the lab: First aid kits are available in the lab
   - Remove gloves and wash cut area.
   - Cover with sterile bandage.
   - Put on clean gloves.

10. All lab coats, dissecting equipment and books should be stored in the locker room or in the cadaver tank. Anything left out after regular lab sessions will be thrown out during daily lab cleaning. **Do not wear dissection clothing or gloves outside of the anatomy laboratory.**

11. Skeletons are available in the lab. Do not remove them from their stands or take them apart.

12. Disarticulated bones are also available, and should not be removed from the lab. Report any broken bone specimens to a faculty member for repair/replacement.

13. The antiseptic soap for washing hands is located on the sinks and locker rooms.

14. **Rule to Remember** - DO not try to catch a dropped tool or retrieve a tool dropped in the tank. In case of injury in the lab during regular lab sessions, notify a faculty member. If an injury occurs after regular lab hours, go to the emergency room.

Lab waste containers: There are three types - locate them, learn them, and use them correctly. These are emptied by three different disposal services, which refuse to empty incorrectly parceled waste.

- Type 1. Red-bagged buckets located under each cadaver table. For skin and fat only.
- Type 2. Regular waste receptacles located around the lab. For waste paper, gloves, etc.
- Type 3. Red Sharps containers located around the lab. For scalpel blades only.

Anatomical Models: All models should be handled with clean hands or clean gloves only. There will be study areas for looking at the models.

Dissection Tank and Cadaver

1. Each group is responsible for keeping the cadaver table clean.

2. The cadaver is covered with a cloth material. Always cover the cadaver with this cloth when leaving the lab. Do not remove the toe or ear tag. This is used to properly dispose of the human tissue.

3. There is one plastic bottle at each table. Fill it only with a wetting solution located in the large crocks at the perimeter of the lab. Use this daily to wet down the cadaver/cloth upon leaving the lab.

4. There is one sponge at each table. It is the responsibility of each group to keep the cadaver and cadaver tray clean.

5. If a dissecting tool falls into the bottom of the cadaver tank**,** do not retrieve it. Replacement tools can be found in the blue bins outside the female locker room. They are compliments of previous classes.

6. If there is a problem or concern about your cadaver (odor, mold, and fixation) or tank (broken mechanism) contact Dr. Romrell.

Keeping your cadaver moist and in good condition and your cadaver table clean, results in a more pleasant lab experience and successful dissection exercises.

Article from:

The New York Times

March 27, 2009

Dead Body of Knowledge

By CHRISTINE MONTROSS

Providence, R.I.

AT the risk of sounding like a fuddy-duddy, I would like to say that sometimes, medical imaging isn't all it's cracked up to be.

As a resident in psychiatry, I depend on the technology to treat my patients. From countless computers in the hospital's hallways and at nurses' stations, I call up images of the people I treat: the black, white and gray CT scans of their skulls, the nuanced M.R.I.'s of their spinal cords and ligaments, the rotating Spect scans that show in three dimensions how well — or how poorly — blood flows through their brains. I can leave the room of an 89-year-old woman who has begun picking imaginary bugs out of the air, look into a screen, and see the tumor that is causing her delirium.

Now however, many medical schools are beginning to argue that imaging technology has improved to the point where it should be used in place of the dissection of human cadavers as the central tool of instruction for young doctors-to-be. This is a mistake. No matter how detailed and versatile they become, computer images can never provide the indelible lessons that novice doctors learn from real bodies.

Nearly every medical student in America begins his career by entering a room full of cadavers and taking one of them apart, layer by layer, piece by piece. Doctors have shared this experience for centuries, ever since Vesalius, Da Vinci and Michelangelo defied religion and government, stole bodies from graves and

churches, and dissected by candlelight in an audacious pursuit of knowledge about the human body. The process is what you would expect: messy and smelly, tedious and time-consuming, emotionally and physically difficult. It is at times awe-inspiring, and at other times profoundly upsetting. It is also, for the medical schools, very expensive. Even though cadavers are donated, it can cost more than $2,000 to prepare a body for dissection.

So medical schools are beginning to re-evaluate their anatomy curriculum in the face of the perhaps inevitable argument: Why not reduce, or eliminate altogether, the burdensome cost of dissecting cadavers and replace it with this new and astounding technology? The computers and software — a considerable expense, but one that need be incurred only once — allow students to study images of the body from every angle and on every plane. They can peel away the muscle on a virtual leg to see the bone beneath, then click a different button, reattach the muscle and see how the limb moves.

Computers can show things that still and lifeless cadavers cannot — blood pumping in real time through the heart's chambers, for instance. And it is far easier to visualize nerves and vessels when they're color-coded on a computer than it is to pick through the indistinguishable gray-green tangles inside a formalin-embalmed cadaver. Because all of this can be done anywhere on any screen, students can study anatomy in this way in the library, in their apartments or, surely someday if not already, on their iPods and cellphones.

At the end of the academic year, there would be no need for old cadavers to be cremated, for new human donors to be found, for deep cleaning the anatomy lab. Come September, the whole system would simply reboot.

But what kind of doctors will they be, these students who have never experienced human dissection? They would have been denied a safe and more gradual initiation into the emotional strain that doctoring demands.

Someday, they'll need to keep their cool when a baby is lodged wrong in a mother's birth canal; when a bone breaks through a patient's skin; when someone's face is burned beyond recognition. Doctors do have normal reactions to these situations; the composure that we strive to keep under stressful circumstances is not innate. It has to be learned. The discomfort of taking a blade to a dead man's skin helps doctors-in-training figure out how to cope, without the risk of intruding on a live patient's feelings — or worse, his health. We learn to heal the living by first dismantling the dead.

The dissection of cadavers also gives young doctors an appreciation for the wonders of the human body in a way that no virtual image can match. It is awe-inspiring to hold a human heart in one's hands, to appreciate its fragility, intricacy and strength.

But most important, the cadavers on their stainless steel tables are symbols of altruism to medical students: They are reminders of how great a gift one can give to a stranger in the hopes of healing. Isn't that the most fundamental lesson we want our doctors to carry to the bedsides of their patients?

Christine Montross, a resident in psychiatry at Brown University, is the author of "Body of Work: Meditations on Mortality From the Human Anatomy Lab."