



UNSW
A U S T R A L I A

**Medical Sciences
Medicine**

Department of Anatomy

ANAT2111

INTRODUCTORY ANATOMY



SEMESTER 2, 2016

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Please read this manual/outline in conjunction with the following pages on the

[School of Medical Sciences website:](#)

- [Advice for Students](#)
- [Learning Resources](#)

(or see "STUDENTS" tab at <http://medicallsciences.med.unsw.edu.au/>)

Cover illustration: One of the Vesalius plates (drawn by Calcar). From: Hixson, J. 1966. *The History of the Human Body*. Cooper Square Publishers, Inc.

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Units of credit

This course is worth six units of credit (6 UOC).

Hours per week

Five hours per week (5 HPW) comprising one 2 hour lecture and one 3 hour laboratory class.

What is anatomy?

Anatomy literally means to break apart or separate the human body into its parts; to dissect the body. The earliest recorded anatomy teachers, Herophilus and Erasistratus, lived in Ancient Alexandria and taught anatomy between 300 BC and the second century AD. However, the roots of anatomy go back much further – perhaps 4,000 years ago – with the mummification practices of the Ancient Egyptians and with the Ancient Greek physicians. The most famous anatomist is the Ancient Roman Galen, whose work remained the standard for almost 1,300 years until the European Renaissance. During and after the Renaissance, anatomy developed into a modern scientific discipline. Therefore, anatomy is one of the oldest scientific fields and one that has always and continues to underpin medicine. It is also a well established scientific discipline in its own right.

Anatomy is a dynamic and diverse science that considers the structures of the body from the cellular level through to the body's external surface and beyond. Anatomy examines the cells and tissues of the body (cell biology and histology), the systems of the body (integumentary, skeletal, muscular, nervous, cardiovascular, lymphatic, respiratory, alimentary, urinary, genital and lymphoid systems), the joints, movements and biomechanics of the human body, human comparative and evolutionary anatomy (anthropology), the development of the embryo and postnatal growth of the infant and child, as well as clinical and radiographic anatomy. Anatomy at UNSW teaches and researches across most of these areas. Note that the term *gross anatomy* refers to the study of the structures of the body that are observable without the aid of microscopes (i.e. the naked eye) and which can be palpated (touched), while *microanatomy* is sometimes used to refer to the microscopic structures of the body (e.g. tissues; the subject of histology).

Course aims

The main aim of this course is to provide students with a solid foundation in the gross anatomy of the whole human body.

Course learning outcomes

Students should complete the course knowing (among other things):

1. *Practical laboratory skills in anatomy and an understanding of the ethics of working with human remains.*
2. *The basic plan of the human body; its major tissue types, body planes, spatial relations and movements.*
3. *Some general anatomical terms including common suffixes and prefixes.*
4. *The role and importance of the skeletal system, the names of major bones, and the names and functions of some major bony features.*
5. *The role and importance of the muscular system, the names of major muscles and muscle groups and their major functions.*
6. *Major types of joints in the human body and the basic structure of joints.*

7. *The role and importance of the central nervous system, its major functional divisions, the names and functions of its major components.*
8. *The major peripheral nerves and their main functions.*
9. *The role and importance of the cardiovascular system and the names and functions of its major components.*
10. *The role and importance of the respiratory system and the names and functions of its major components.*
11. *The role and importance of the digestive system and the names and functions of its major components.*
12. *The role and importance of the urinary system and the names and functions of its major components.*
13. *The role and importance of the reproductive systems and the names and functions of their major components (males and females).*
14. *The capacity to apply knowledge and to think critically within the anatomical sciences.*

The University of NSW has developed a list of attributes which its graduates should possess upon graduation (the 'graduate attributes'). The curriculum and assessment of this course have been designed to help students to develop these capabilities. Students completing the course will have gained knowledge and skills that contribute to directly to them acquiring these attributes during their study at UNSW. One way this has occurred is through curriculum mapping of this course.

For Science, the UNSW graduate attributes are as follows:

1. *Research, inquiry and analytical thinking abilities.* Technical competence and discipline specific knowledge. Ability to construct new concepts or create new understanding through the process of enquiry, critical analysis, problem solving, research and inquiry.
2. *Capability and motivation for intellectual development.* Capacity for creativity, critical evaluation and entrepreneurship. Ability to take responsibility for and demonstrate commitment to their own learning, motivated by curiosity and an appreciation of the value of learning.
3. *Ethical, Social and Professional Understanding.* Ability to critically reflect upon broad ethical principles and codes of conduct in order to behave consistently with a personal respect and commitment to ethical practice and social responsibility. Understanding of responsibility to contribute to the community. Respect and value social, multicultural, cultural and personal diversity.
4. *Communication.* Effective and appropriate communication in both professional (intra and inter disciplinary) and social (local and international) contexts.
5. *Teamwork, collaborative and management skills.* Ability to recognise opportunities and contribute positively to collaborative scientific research, and to perceive the potential value of ideas towards practical applications. Demonstrate a capacity for self management, teamwork, leadership and decision making based on open-mindedness, objectivity and reasoned analysis in order to achieve common goals and further the learning of themselves and others.
6. *Information literacy.* Ability to make appropriate and effective use of information and information technology relevant to their discipline.

Course relationships

ANAT2111 *Introductory anatomy* and ANAT1521 *Anatomy for Medical Science* are the foundation course for all advanced (Level III) gross anatomy courses at UNSW: *Visceral Anatomy* (ANAT3121), *Functional Anatomy of the Head, Neck and Back* (ANAT3131), *Functional Anatomy of the Limbs* (ANAT3141) and *Neuroanatomy* (ANAT3411). A number of other courses offered by anatomy compliment these gross anatomy offerings, and students with an interest in anatomy are strongly urged to undertake them: *Histology: Basic and Systematic* (ANAT2241) and *Embryology: Early and Systematic Development* (ANAT2341). Moreover,

those students with an interest in microanatomy and development will find the Level III courses *Microscopy in Research* (ANAT3212) and *Cell Biology* (ANAT3231) of interest. More generally, anatomy courses compliment the subjects offered by other areas within the School of Medical Science (i.e. Physiology, Pharmacology and Pathology) as well as courses taught in biological and biomolecular science, genetics, psychology, optometry, vision and food science, microbiology, immunology and engineering.

Continual course improvement

In this course evaluative feedback on this course is gathered at the completion of the course, using among other means, UNSW's Course and Teaching Evaluation and Improvement (CATEI) Process. Student feedback is taken seriously, and continual improvements are made to the course based in part on such feedback. Based on feedback from 2008-2015 the amount of material covered in some practical classes has been modified and the order in which some topics are presented has been changed.

Teaching rationale

While in many ways this course is quite conventional, especially in terms of teaching strategies, students are strongly encouraged to engage with the ideas and materials covered. The role of the teacher (lecturer/tutor) is to impart knowledge, but also to help students navigate their way through the vast subject that is anatomy. Students should feel free to question and think critically, even about basic knowledge covered; things that might be considered unwavering 'facts'. With this in mind, students are strongly encouraged, and will be supported to be, enquiring; to ask questions, make pertinent observations, and to share experiences and knowledge with the lecturer/tutors and classmates. The philosophy of the course is also fundamentally about helping students to develop an enthusiasm for learning, especially about their own body and biology. This course also aims to exploit the teaching-research nexus, by feeding research findings and developments, as well as knowledge and skills of the teachers, into teaching and learning.

Teaching strategies

Teaching and learning are a mixture of traditional style lectures and laboratories, as well as videos, where relevant. This course is comprised of a 2 hours lecture and a 3 hours laboratory class, per week (total of five hours per week).

Lectures (Colombo Theatre A)	Laboratory (Room 101 Wallace Wurth Bldg)
Tuesday 9:00-11:00am Weeks 1-6,8-12*	Group A: Tuesday 11:00am-2:00pm Weeks 1-6, 8-12*
	OR
	Group B: Tuesday 2:00pm-5:00pm Weeks 1-6,8-12*

* Note: in week 7 and 13 there will be no lectures and there will 2 x 2 hour revision sessions on Monday and Tuesday from 9-11am & 11am-1pm. Spot test 1 and 2 will be held in weeks 7 and 13, respectively, and during the normal practical times (see course timetable below for more details).

Laboratory class attendance and behaviour

There is an 80% attendance requirement for the 11 laboratory classes of this course. A roll will be taken by your tutor during each practical class (please note that the revision classes are not compulsory and are NOT included in this requirement). The physical study of anatomical specimens (i.e. professional dissections of human bodies) as well as models and x-rays is an essential component of this course. If you do not attend the laboratory classes then you have not satisfactorily completed this requirement. Any missed class (for either health and/or any other reason) will be counted as an absence. If you are absent for 3 or more of the 11 laboratory classes then you will be given an absent fail for the course. An application for special

consideration should be lodged with the Student Central for any class which is missed for health reasons.

For the laboratory classes of this course, you will be required to study human anatomical (prosected = professionally dissected) specimens. Each year, people donate their bodies to UNSW so that you and your colleagues can learn about the human body directly from their remains. These are precious materials provided through the extraordinary generosity of the public (our donors and their families). This is a special privilege afforded very few people. By law, responsibility to the donor and their family members, and as a matter of good ethical practice you must treat all human remains with great respect and care. Mishandling of specimens and/or inappropriate behaviour within the anatomy laboratory (including the photographing of any specimens) is a form of academic misconduct and will be reported to the Pro-Vice-Chancellor (Students). Academic misconduct is taken very seriously at UNSW and can result in expulsion from UNSW as well as in criminal proceedings.

Course assessment

1. Mini Lab Tests	5%
2. Spot Test 1	25%
3. Spot Test 2	20%
4. Written Exam	50%

1. Mini Lab tests

Eleven x 5 minute weekly tests are held at the start of each laboratory class. *Format:* students will be given a test page and are required to write the names of the anatomical structures which are labelled on two projected slides. The diagram on each slide is taken from the slides of the immediately preceding lectures. Test pages are marked by your tutor and the best 9 results of the 11 weekly tests will be used to give a grade out of 5 for the entire semester.

2. Spot tests

These tests are held in room 101 the Anatomy Dissection Laboratory and they aim at assessing the student's knowledge and skills acquired during the laboratory classes. *Format:* the test is comprised of a minimum of 10 questions. Each question is divided into 6 parts. For the first four parts (A, B, C & D), the student is required to write the names of four structures which are flagged with corresponding pins on a specimen, model or image. The student will have approximately 2 to 2.5 minutes to write the names of these four structures while sitting in front of the flagged material. The student has an additional 2 to 2.5 minutes to then answer the other two parts of each question while sitting on a rest seat that does not have a labelled specimen, model or image in front of it. Each of the latter two parts is usually a question regarding the function or some other attribute of one of the structures which has been labelled in parts A to D. Tests usually run no more than 1 hour. This assessment contributes to the development of graduate attributes 1-4 (see above).

- Spot Test No.1: Covers the practical content covered in Weeks 1-6.
Usually held in Week 7 during the normal Practical time (see timetable for specifics).
- Spot Test No.2: Covers the practical content covered in Weeks 8-12.
Usually held in Week 13 during the normal Practical time (see timetable for specifics).

3. Written tests

A single 2 hour written exam will be held during the formal examination period. The aim of this exam is to assess the student's knowledge of the course's lecture and practical class content as well as and their ability to make connections between ideas and problem solve. The written exam will usually comprise 50 multiple choice questions, 20 short answer questions, as well as 3 to 4 short essay questions. Some of the essay questions may require the adding of labels and text to tables, graphs and/or pictures whilst others may require long text only answers.

Course resources

Website:

UNSW Moodle (see: moodle.telt.unsw.edu.au/login/index.php)

Recommended Combined Text, Atlas & Electronic Resource:

Pearson (see: www.pearson.com.au/9781486042562).

Text: Marieb EN, Wilhelm PB & Mallat J (2014). *Human Anatomy, 7th ed. (International Edition)*, Pearson. **Atlas:** Hutchinson M, Mallat J, Marieb EN, Wilhelm PB (2007). *A Brief Atlas of the Human Body, 2nd ed.*, Pearson Benjamin Cummings. **Electronic Resource:** Anatomy Practice Lab 3, Pearson.

Wiley (see: au.wiley.com/WileyCDA/WileyTitle/productCd-EHEP002936.html).

Text: Tortora, GJ & Nielsen, MT (2014). *Principles of Human Anatomy, 13th ed.* Wiley. **Atlas:** Tortora, GJ (2004). *A Photographic Atlas of the Human Body with Selected Cat, Sheep and Cow Dissections 2nd ed.*, Wiley. **Electronic Resource:** Real Anatomy 2, Wiley.

Other Texts & Atlases:

Other books which may be used instead of or in addition to those above:

- Drake R, Vogl AW & Mitchell AWM (2010). *Gray's Anatomy for Students, 2nd ed.*, Churchill Livingstone.
- Snell R (2007). *Clinical Anatomy by Systems*. Lippincott, Williams and Wilkins.
- Moore K, Dalley A & Agur AMR (2010). *Clinically Oriented Anatomy, 6th ed.*, Lippincott, Williams and Wilkins.
- Rohen J, Yokochi C & Lütjen-Drecoll E (2010). *Colour Atlas of Anatomy: A Photographic Study of the Human Body, 7th ed.*, Lippincott, Williams and Wilkins.
- Nielsen MT & Miller S (2011). *Atlas of Human Anatomy*, Wiley.

Anatomical terms

One of the largest challenges for new students in anatomy is learning anatomical terms. In many ways the process is like learning a new language. All scientific disciplines have a set of terms and across the whole of science they are derived mostly from Latin and Ancient Greek words. Why Latin and Ancient Greek? Latin, in particular, is a 'dead' language, meaning that no one alive today uses it as the 'mother' tongue. Thus, it is not subject to fashions and constant change, like most living languages, especially English. Moreover, the spelling of Latin and Ancient Greek words has been agreed to for a long time.

In Australia and other English speaking countries, anatomical terms are Anglicised (translated to English). This means that in many cases the terms we teach are the English equivalent of the Latin or Greek word (e.g. Latin = *Corpus ossis ilii*; English = Body of the ilium). There are, however, still plenty of Latin and Greek terms used. Their pronunciation, however, is an entirely different matter. It varies greatly across English speaking countries; even at UNSW you will find lecturers employing different pronunciations, partly as a result of where they learned their anatomy! What matters is that we all know which structure we are referring to when we use a particular term; there are no points for correct pronunciation as most of the variants are equally correct!

An international organisation called the *Federative Committee on Anatomical Terminology* with representatives from many countries has published the standard (agreed) set of anatomical terms that anatomists follow. It is called *Terminologia Anatomica* and the last edition was published in 1998. Most internationally oriented textbooks (such as *Gray's Anatomy*) apply *Terminologia Anatomica*. In this course, we strive also to use this standard set of anatomical terms as much as possible as we believe that it represents best international practise as well, as making it easier for you to learn.

The terms that you need to know in laboratory classes are given in **bold**. You should, however, endeavour to understand all of the information given in laboratories in order to do well in the course.

Health and Safety: Rules for Students in the Dissecting Room

There are some rules that are enforced for the safety of the staff and students, while others are concerned with the need for care and respect of the prosection material.

General courtesy

- Students are required to attend each lecture and the assigned tutorial/laboratory class unless given special permission. Applications for Special Consideration should be submitted online to Student Central
- You may enter and view specimens in the Dissecting Room 101 only in the presence of your tutor and/or during your designated tutorial/laboratory class hours. You are not permitted to take visitors into the Dissection Room.

Health and Safety Rules

A detailed risk assessment for student activities in the Dissecting Room is located on the notice board at the front entrance (near 1st floor lifts).

When in the Dissecting Room, you are required to:

- **Always put on your laboratory coat** when you enter the lab. If you have forgotten to bring your lab coat, purchase a disposable coat from the ground floor in WW building or the Union shops on campus. Lab coats must not be worn in the hall or anywhere outside the laboratories.
- **Wear covered shoes with enclosed heels**, never thongs or sandals.
- **Wear latex or vinyl gloves** when touching wet specimens (gloves are provided in the lab and are also available from the Union Shop near CLB theatres).
- **Never eat or drink.**
- **Never put anything in your mouth.** For example, pens or pencils that you may have picked up from the table.
- **Avoid inhaling** preservative solutions for prolonged periods. If you feel in need of fresh air, ask permission to leave the laboratory for a few minutes.
- **Report all accidents or incidents immediately** to a staff member for assessment without exception. Injuries involving sharps or needle-stick will require a blood test as soon as possible.

At the end of your laboratory class:

- **Cover wet specimens** with the towels provided. Make sure that towels do not hang over the edge of the table, because this allows fluid to drip onto the floor. Fluids on the floor are a major safety hazard and should be reported to staff immediately.
- **Replace stools** under the tables in your cubicle.
- **Remove your gloves** and dispose in the biowaste bins provided.
- **Wash your hands** and instruments thoroughly with the soap provided and dry your hands with the paper towel.
- **Remove your laboratory coat** when you leave the dissecting room.

Preservative solution

There are 3 main chemicals used as preservation fluids in the Dissecting Room. These are phenoxyethanol (2% in solution); methylated spirits (10%) & formalin (5%)

The safety data sheets (SDSs) for these chemicals are located by the lab First Aid Kit and also on the notice board outside the lab. Women of reproductive years, and especially those who know they are pregnant, should note that all of these are suspected human reproductive and developmental toxins and therefore may pose a hazard to the unborn child. In addition, formalin

(formaldehyde solution) is a human carcinogen. Avoid these chemicals coming into contact with your eyes and skin and they should not be ingested.

Most anatomy specimens are stored in 2% phenoxyethanol, which is classified as relatively non-toxic. You should always wear gloves when handling specimens and must avoid ingestion of this chemical and contact with your skin or eyes. Formaldehyde is reported to cause allergic skin and respiratory effects. The potential for adverse health effects, however, is markedly reduced at the concentrations used for embalming and storage of specimens in the Dissecting Room, i.e., the "formalin" solution is less than 5% of a 37% solution of formaldehyde. The specimens provided for classes are without any formalin and a combination of air extraction and conditioning continuously changes the air in the Dissecting Room.

First Aid

Room 101 staff can provide First Aid during office hours and a list of other safety personnel is located beside the building lifts. First Aid Kits are located on the left wall near the Gross Anatomy Laboratory entrance door and in the east wing on the ledge opposite cubicle E4. All incidents must be reported.

Emergency evacuation

In the case of a fire or other emergency the evacuation alarm will sound. When it sounds for the first time this indicates that everyone should get prepared in case it is necessary to evacuate. When it sounds for the second time, an announcement will be made over the speaker system - **follow these instructions**. Staff will be on hand to supervise any evacuation and the emergency exit is at the south end of the lab, **do not use the lifts**. The evacuation assembly area is the landscaped space immediately to the east of the Chancellery and adjacent to the Clancy Auditorium. **Do not assemble anywhere else** and do not leave this area until instructed.

Additional Safety Information

If additional safety information is required you can ask the course convenor or the Anatomy Dissection Laboratory Manager (Ms Jo Allan). The latest safety information is always available from the SOMS HS Webpage:

<http://medicalsciences.med.unsw.edu.au/staff/health-safety>

Care and respect of prosected material

You are learning from human material prepared from people who have generously donated their bodies for the benefit of science. Skilled staff members have dissected the specimens to allow you, the student, to see anatomical structures in fine detail. Apart from caring for the specimens, it is important for all students learning Anatomy to have and show **utmost respect** for the specimens at all times, in the Dissecting Room, Room 101, and in the Anatomy Museum Room 105. **Great care** should always be exercised when handling specimens, in order to preserve their delicate structure.

Some specific points:

- Always use only blunt forceps to handle specimens and probes to point to structures, i.e. never pull at any parts of the specimen.
- It is illegal for any anatomical material to be removed from the premises of the Department of Anatomy for any purpose whatsoever (except of course, for the funeral). All anatomy specimens are micro-chipped for identification and record keeping.
- Photography and video recording are not permitted in the Dissecting Room 101, or the Anatomy Museum 105.

It is your responsibility to make sure that you read and sign the form on the next page before you attend your first prac in the dissecting room. Keep the signed form in your prac manual and bring it to classes with you. It is not necessary to give it to your tutor or Course Convenor).

Student Risk Assessment

Hazards	Risks	Controls
<p>Physical Cold temperature (16°C) Sharp bone/plastic</p> <p>Biological Fungi, bacteria (tetanus), hepatitis B and C</p> <p>Chemical Formaldehyde Methanol 2-phenoxyethanol</p>	<p>Cold Penetrating wound of foot</p> <p>Infection</p> <p>Corrosive/Flammable Irritant/toxic Irritant</p>	<ul style="list-style-type: none"> Wear laboratory coat over appropriate warm clothing Wear enclosed shoes with full coverage of the dorsum of the foot Have appropriate immunisation Do not eat, drink or smoke in the Gross Anatomy Lab Do not place anything (e.g. pens, pencils) into your mouth Use disposable gloves when handling wet specimens and do not cross-contaminate models or bones with wet specimens Always wash hands with liquid soap and dry thoroughly with disposable paper towel before leaving Low concentrations of chemicals used Chemicals used in well ventilated area Safety Data Sheets for chemicals available in the laboratory

Personal Protective Equipment required

 Closed in Footwear	 Lab. Coat	 Gloves	
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Emergency Procedures

In the event of an alarm sounding, stop the practical class and wait for confirmation to evacuate from demonstrators. Then wash your hands and pack up your bags.
Follow the instructions of the demonstrators regarding exits and assembly points.

Clean up and waste disposal

- Cover wet specimens with the towels provided. Make sure that towels do not hang over the edge of the table, because this allows fluid to drip onto the floor. Fluids on the floor are a major safety hazard and should be reported to staff immediately.
- Replace stools under the tables in your cubicle.
- Remove your gloves and dispose in the biowaste bins provided.
- Wash your hands and instruments thoroughly with the soap provided and dry your hands with the paper towel.
- Remove your laboratory coat when you leave the Gross Anatomy Lab.

Ethics Approval

This type of practical has been previously considered and approved by the UNSW Human Research Ethics Advisory Panel (HREC09372).

Declaration

I have read and understand the safety requirements for this practical class and I will observe these requirements.

Signature:.....Date:.....
Student number:

Course Schedule: Semester 2, 2016

Week	Date	Lectures (Tuesday 9-11am)	Date	Laboratory Classes (Tuesday 11am-2pm or 2-5pm)
1	26 Jul	General Anatomy, General Skeletal System & Axial Bones	26 Jul	General Anatomy, General Skeletal System & Axial Bones
2	2 Aug	Appendicular Bones & The Articular System	2 Aug	Appendicular Bones & The Articular System
3	9 Aug	General Muscular System, Axial & Upper Limb Muscles	9 Aug	General Muscular System, Axial & Upper Limb Muscles
4	16 Aug	Lower Limb Muscles, General & Central Nervous System	16 Aug	Lower Limb Muscles, General & Central Nervous System
5	23 Aug	Peripheral Nervous System	23 Aug	Peripheral Nervous System
6	30 Aug	Eye & Ear	30 Aug	Eye & Ear
7	5 Sept 6 Sept	Monday: Revision Session (9-11am): Lab Group A <u>Only</u> & Revision Session (11am-1pm): Lab Group B <u>Only</u> Tuesday: No Lectures - Revision Session (9-11am): Lab Group B <u>Only</u> & Revision Session (11am-1pm): Lab Group A <u>Only</u> Spot Test No.1 (1-2pm): Lab Group A <u>Only</u> & Spot Test No.1 (2-3pm): Lab Group B <u>Only</u>		
8	13 Sept	Cardiovascular System	13 Sept	Cardiovascular System
9	20 Sept	Respiratory System	20 Sept	Respiratory System
	27 Sept	<i>Mid-Semester Break (26 September - 3 October) No Lectures and No Practical Classes</i>		
10	4 Oct	Digestive System	4 Oct	Digestive System
11	11 Oct	Urinary System, Pelvis & Female Reproductive System	11 Oct	Urinary System, Pelvis & Female Reproductive System
12	18 Oct	Male Reproductive & Autonomic Nervous Systems	18 Oct	Male Reproductive & Autonomic Nervous Systems
13	24 Oct 25 Oct	Monday: Revision Session (9-11am): Lab Group A <u>Only</u> & Revision Session (11am-1pm): Lab Group B <u>Only</u> Tuesday: No Lectures - Revision Session (9-11am): Lab Group B <u>Only</u> & Revision Session (11am-1pm): Lab Group A <u>Only</u> Spot Test No.1 (1-2pm): Lab Group A <u>Only</u> & Spot Test No.1 (2-3pm): Lab Group B <u>Only</u>		