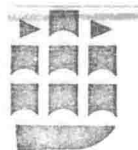


ENGLISH FOR SCIENCE AND TECHNOLOGY

MEDICINE

Teacher's Notes

Tony O'Brien



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Introduction to Nucleus: Medicine

1. Aims of the Students' Book

The aim of the medicine course is to develop in the student a competence in using English receptively and actively to enable him to extract information from written and oral texts and from visual forms of presentation, and to develop the student's ability to follow continuous argument. To put it another way, the aim is to give the student both the confidence and the ability to go to a book or a journal, to a lecture or other oral presentation, on a topic related to medicine, and to equip him to find, understand and extract the information that he needs.

In order to do this the student will need to be able to read and to listen for information, but he will also need (and want) to talk about what he reads and hears, and so the course includes a considerable amount of oral work—from the basic level of pronunciation of medical terms to questioning and discussing medical concepts. Provision is also made for written work, both as consolidation and reinforcement of what is being learnt and as practice in a skill which some students will be using from the early stages of their studies. The emphasis to be given to the different skills will vary according to the needs of the learners but this book can serve both teacher and learner as a basis for a course in all four skills.

2 Content of the Students' Book

The course does not aim to teach medicine: its purpose is to teach English for medicine. But in response to the interests and needs of the learners, the 12 units manage to deal in part with many of the fundamental subject areas common to medical, or medicine-related courses the world over, such as anatomy, biochemistry, histology, physiology, pathology, parasitology, medicine, tropical diseases, etc. Within the units there is as much recycling of vocabulary and concepts as possible so that the subject matter in later units has been dealt with at different levels in earlier units. Even more important than the subject areas for our purposes is the presentation of medical and scientific concepts (e.g. the process of disease, its causes and effects) and the way these are expressed in medical texts. This includes not only certain vocabulary items but also related structural patterns and features of connected, organised text, as well as how ideas are developed and how the parts relate to the whole. The later parts of the course, particularly, deal with how to approach a text to get from it what is required.

And running through the book is a considerable emphasis on visual presentations of information and how to interpret them. Diagrams are used initially to present vocabulary items, and later on to emphasise the communicative value which they usually have in textbooks, etc. They are of course an extremely useful aid to teaching, in that they act as non-verbal communication, as a stimulus for language practice, as a guide in extracting essential bits of information, and so on; but they are also a part of any textbook or oral presentation in their own right.

3 Progression of the course

The book aims to be quite different in Unit 12 from what it is in Unit 1. There is a progression of difficulty, and a progression from strongly guided and controlled activities to much freer authentic communicative tasks. Within each unit there is a progression

from the sentence level to the paragraph level and beyond. There is an overall development from elementary sentence patterns to more complex ones, especially in the noun phrase where simple, one-word premodification (e.g. *a long tube* or *blood cell*, where *tube* and *cell* are the head nouns) gives way to quite complicated pre- and postmodification involving a variety of finite and non-finite clauses (e.g. *thick ovoid or rod-shaped structures known as chromatoid bodies*, where the head noun is *structures*). Guided exercises for production give way to less guided, more open-ended ones. The simple arrangement of ideas in a text becomes more complicated, both in the way reference is made between parts of the text and in the way ideas are organised and modified (in some cases even badly arranged—which is typical of all too many texts!). And the medical topics develop in the way they might in a medical course, starting with fundamentals, such as biology or anatomy, and building on those so that the more advanced areas dealt with later in the book (e.g. pathology, medicine) have already been given a thorough grounding in earlier units.

4 Aims of the Teacher's Notes

So far a general overview of the purpose of the course has been attempted. In the subsequent sections some general suggestions will be made concerning how the material should be taught, and some notes will be given on each unit. These notes will include *a*) a summary of the aims of each unit; *b*) an outline of the language content (lexical, structural and functional); *c*) notes on the background to the subject matter (where appropriate) and an explanation of any difficult points; *d*) suggestions on teaching the exercises and how to extend them with other activities; *e*) the listening text (which is available on cassette); *f*) the answers to the questions in the unit.

The notes and suggestions for teaching are set out section by section, and are followed by the answers to the section. This is done to enable teachers to look at the notes and the answers together.

5 Handling the subject matter

If you are interested in medicine and its various branches you should have little trouble with the subject matter in this book because it deals with topics that are either straightforward or else relatively simple expositions of diseases or conditions which are often described or discussed in newspapers, magazines, and radio and television programmes all over the world. I need only encourage you to furnish yourself with some general medical works, from your library perhaps (see the bibliography at the end of the book for some suggestions), and to make contact with subject teachers in your faculty or institution.

If you are worried about the subject matter, then let me say first that it is a natural initial reaction, which usually disappears when you become interested in the field—so *that* is the first thing to cultivate, and it will certainly make your teaching more enjoyable. (And just think how you will be able to confound the hypochondriacs you know—or, if you are one yourself, what miseries you will be able to enjoy!) But as this kind of suggestion does not offer any short-term encouragement, let me offer you these consoling reflections:

- this course has been written and taught by EFL teachers from backgrounds in languages, sociology, literature and law
- the material is basically self-explanatory, especially with all the diagrams

- where it is more difficult it is usually an extension of an area covered in an earlier exercise or unit
- these notes contain many suggestions, and advice on points of difficulty
- there is a glossary at the back of the Students' Book
- there are many simple medical dictionaries available
- you can, and should, discuss the medical content with your colleagues

Remember always that you are not teaching medicine, but English. It is for your students to understand and be able to explain medical concepts; you can help them to do it in English.

6 How to teach the course

Each main unit consists of four sections, Presentation, Development, Reading and Listening, each of which is substantially different from the others, so I propose to group the suggestions concerning methodology and exercise type under these four headings, though it must of course be remembered that they are by no means exclusive.

6.1 Presentation

This section usually concentrates on the oral production and practice of basic patterns and concepts in a variety of contexts (with a variety of data or information) which you can extend to other areas, both medical and general. They are usually presented in diagrammatic or tabular form and are then transferred to verbal form by exercises such as: substitution tables, sentence matching, choosing the correct word, gap fill, sentence completion, true/false and open-ended questions. Note that if you find a particular exercise too difficult, you can always simplify it, e.g. by changing a 'gap fill' exercise into a 'choose the correct word', or open questions into sentence completions.

A good start to each unit can be made by describing the first diagram(s). Here there is opportunity for revision; for example of ways of expressing position from Unit 2 in Exercise 1 of Unit 3 (and in fact with just about any diagram). You will want to make sure that the new medical terms are understood and that your students can pronounce them well. Drilling is particularly appropriate at this stage of the lesson, whether as a class, in groups or individually, and whether it is teacher-student or student-student. As for working out the answers to the exercises, it is a good general principle to let your students do that on their own, in pairs, or in small groups. This ensures that all are involved in the activity and gives you the opportunity to walk round, giving help where needed and getting feedback on how your students are performing. Then get the students to say the completed sentences in full so that all have the chance to practise the new patterns and vocabulary early on in the unit. Try then to extend the practice to other areas, general or medical. Encourage your students to think of related areas, and suggest topics that they have recently dealt with in their other subjects (again the importance of good contacts with their other teachers). Develop language games where your students have to identify the matter which has been presented in the unit but is now being completely reordered or dealt with in a different way. For example one group of students can describe the position or structure or function of an organ and the others have to name the organ described, which may be one presented in the book but could also be one which they know of from their other studies. And of course the same kind of language can be practised in similar ways with a great variety of non-medical subjects.

6.2 Development

This section marks the transfer from sentence level to short texts. It extends the practice of patterns and concepts in new contexts but it also presents the ways in which ideas are joined together and arranged into paragraphs or sense units. This is done using similar exercises to those already mentioned, plus labelling or interpreting diagrams, extracting specific items of information, multiple choice questions, identifying the reference of pronouns, etc., ordering sentences into paragraphs, joining ideas/sentences, and producing parallel passages based on a model.

There are more writing exercises in this section, so here you must decide how much to ask your students to produce. For a weaker class you will only want them to write after the material has been thoroughly dealt with orally, perhaps by copying from the final version you have written up on the board. On some days your stronger classes may prefer to settle for oral composition in class with the opportunity for written follow-up if they choose, or as homework. At other times it may be suitable to ask your students to write in the class. The important thing for you is to vary the activity according to the requirements of your students, and their reactions in the class on the day. Once again there is a range of possible ways of dealing with these exercises: orally as a class; individually/in pairs/in groups, then orally as a class; for homework then corrected in class; written in class then corrected orally, or by writing on the board (student or teacher), etc.

6.3 Reading

The passage(s) should always be read silently. Encourage your students to go quickly straight through the passage the first time they read it, not stopping at words they do not know. This is vitally important for getting the students to read naturally and to approach a text in the right way, which involves: getting a general idea of the development of the argument or content of the passage, developing a feel for which information is important, inferring the meaning of new words from the context, and leaving alone sections of the text which are not relevant. Many students find it difficult to get away from the word by word approach to reading in a foreign language, but they will never be efficient readers unless they do. A variety of tasks is given to the student with each passage but the first question is always short or general to encourage this quick first reading of the passage. The intensive work and the more detailed questions begin with the second reading.

It is also a good idea to check that your students are not reading too slowly. Count the number of words in the passage (the first three units have 186, 165 and 239) and time your students' first reading of it. You may well find reading speeds of as low as 50 words per minute. Point out that this will really hamper their studies and that to be able to do the work which as medical students they will have to do, they will need to be able to read at least 200 words per minute. You can help them to increase their speed by pointing out that if they read with their lips moving, or their fingers on the page, they are reading at the speed of speech or slower; they must practise reading a group of words together with each movement of the eye so that the eye only needs to move three or four times for each line of print.

Having answered the first, general question, your students should then look at the questions or exercises which follow the passage, and read the passage a second (and a third, and a fourth...) time to find the information required to answer. Do not go through the text looking at all the unknown words and explaining them. The exercises are

designed to bring out the meanings of all the important words (and more besides) and to give the students meaningful information-seeking activities. Going through a text word by word does not help anyone to learn to read, it only helps to understand one particular text. For the same reason, it is preferable that the students do not prepare the text in advance, but that they come to it 'cold' as they would to a book taken from the library.

An even wider variety of exercise type is found in this section, including: choose/give a title; answer a question of detail, read and label; true/false questions, multiple choice questions, open questions; matching/ordering sentences or diagrams; summarising by a classification diagram/flow diagram/notes/table; rearranging, rephrasing; inserting dependent statements in the text; writing based on a model, etc. As before there are a number of ways of proceeding (as a class, individually, in pairs, or in groups; orally then written, or written then oral check, etc.), but in this section it is especially important for you to try to avoid giving the answers. Let your students decide among themselves; where there is disagreement let them discuss, and here you should particularly encourage them to quote from the passage to justify their answers. All the passages have the lines numbered so that in response to your prompt 'Where does it say that?' (or 'Where can you find that in the passage?' or 'What does it say in the passage?') the student can give the actual words from lines 12 and 13, or wherever. This, incidentally, is the place for the reading aloud of a text; this is where it naturally and correctly occurs.

Another type of question which should constantly be on your lips is the one which asks about the reference of pronouns, relative clauses, definite articles, and so on. 'What does *it* in line 18 refer to?' 'What does *which* refer to in line 7?' 'What is the subject of *connected to*?' and so on. There are some examples of this kind of question in the book (and many other questions highlight those very features), but you should always use them yourself to make sure that your students know what is being referred to, otherwise they will be lost by the fourth sentence! You can also help them with how words are built up ('Where can we divide this word?' 'What does this part mean?') and the way sense groups are formed, particularly in the noun phrase ('Which words modify this noun?' 'Where does this modifying phrase end?')

Finally, when the exercises have been completed, particularly if there are diagrams, tables or charts which have been labelled or filled in, you can use them for oral or written work to reconstruct or summarise the main points of the passage, or to describe the diagram itself, or the ideas behind it. Here again you are eliciting a natural communicative activity: we read to get information and we then reinterpret and relay that information to others, usually for slightly different purposes.

6.4 Listening

The listening passage is always related to a diagram or tabular summary of information. You should first ensure that your students are familiar with the sounds of all the terms that are new to them. This does not, however, mean teaching the words, because the purpose of the exercise is that the students should get the meaning from the passage by listening to the passage, not your paraphrase of it, and not by reading it.

So when you have explained clearly what it is they have to do, and when your students have read the questions so that they know what they have to listen for, play the tape (or read the passage yourself). Train your students to do the task, to answer the questions, as they listen, not after. It is too much to retain if they leave it all to the end. As the activity is

an unfamiliar one for many students, you may find that you have to repeat the passage, but beware of succumbing too readily to such requests. Remember that the purpose of the listening section is to train your students to listen for information, and usually in such an activity there is only one opportunity to do so (e.g. a radio talk or a lecture). If they know that you will repeat the passage, they know that they do not need to listen carefully the first time.

For the same reason, they should not be given the text of the passage. If there is no text, the student must be present and he must be listening. Bear in mind also that the listening passages have built-in features of spoken English, of oral presentation, which are not appropriate to the written form of the language. Part of the training for the student is learning how spoken language is organised, how the information is organised and signposted, and learning how to filter the useful information from the padding.

If you feel that the passage is too difficult, you can simplify your students' task by, for example, labelling some parts of the diagram before the text is heard (or before the second listening), or you can break the passage up into sections and demonstrate how to extract the necessary information by stopping after the parts of the text which contain the answers to the questions, or by listening to the key bits more than once.

As a normal procedure, find out what answers your students have got after listening once, and let them discuss any differences or difficulties, explaining or justifying their views by reference to what they (think they) have heard. But do not give them the correct answer at this stage, because after such a discussion their second listening will be directed towards those points of difficulty, or the bits they missed the first time. So play the passage again, and try to get your students to decide on the correct answers, after more discussion if appropriate. You can confirm, or prompt the discussion onto the right tracks.

And finally, as for the reading passage, the completed exercises will have provided you with diagrams or tables which can now be used to get the information back from the class, verbally or in writing, and can usually be used as the basis for a revision of much of the work of the whole unit.

7 General

7.1 Vocabulary

The vocabulary load is fairly high but it should be possible for your students to cope with it as they go along: i.e. they should not be preparing the work ahead, but rather training themselves in class in the skills of reading, particularly inferring meaning from diagrammatic and contextual clues. Their work outside the class can then concentrate on consolidating what has already been covered, and reading round the subjects in English. If however you feel that a vocabulary list is necessary, it is preferable that at least the major part of it be given at the end of the unit or section, so that your students are not discouraged from training themselves in this skill of working out meanings for themselves. Remember that you have the glossary at the back of the book and your students can be encouraged to use that if they are going to use anything. Do not forget to show them *how* to use the glossary.

One other point here is that the Teacher's Notes will sometimes draw fine distinctions of meaning and of use of certain words. This is for your information, not necessarily for your students at all (especially as any term which is not purely technical will probably be used in different ways by different authors or lecturers).

7.2 Follow-up work

Always try to relate the work you are doing in the English class to your students' other courses as well as to their general interests. I have already stressed the importance of having good contacts with their other teachers so that you can suggest areas which your students might use for providing supplementary examples. You could give them additional exercises from these areas by, for example, bringing in realia (such as a skeleton—borrowed from the anatomy department, or local statistical data—from somebody's thesis, etc.), by preparing diagrams of related topics, by preparing parallel texts (and the more texts the better, so that your students get the idea of looking at a text for a specific purpose or item of information, rather than for the artificial purpose of answering a teacher's detailed questions), and by setting them projects which will involve them in doing their own little bits of research in the library (initially from books selected and referred to by you, but later perhaps on their own, or maybe with the faster students planning projects for the others).

7.3 Flexibility

Always be prepared to cut out or postpone an exercise, to add another one, or to adapt an existing one to another form, in order to suit your class, either in terms of their level in general or their mood on a particular day.

7.4 Testing

In countries where tests are traditionally set only on the actual material covered in class, it is important to establish the principle that tests will be on parallel or related texts as well as the content of each unit. We have successfully prepared tests with exercises as varied as those in the book, some using the same vocabulary and patterns, others using reading passages with similar features of organisation and arrangement but different content (perhaps on a topic that was covered in a presentation or development section, but not in a reading passage). The emphasis of this course should be on *how* to read, not *what*, and it is the *how* that you should test.

7.5 Duration

The number of hours you will take over each unit will vary considerably, depending on the intensity of your course, the ability of your students, the amount of work done outside the class times, the balance of oral and written work, and so on. But as a general guide, with an average class doing about five hours per week of English, the book would probably take the best part of an academic year. The units might average 8 to 10 hours of timetabled classes each.

Note: In Answers to exercises, alternative answers, of which the student may choose one only, are indicated by strokes (/). Optional items, which fit well into answers but are not demanded by the questions, are placed between brackets ().

UNIT 1 Properties and Shapes

Aims

To present and practise ways of expressing shapes and properties in describing the organs of the body, blood and bacteria.

Main language items

Descriptive statements in the simple present:

Noun phrase + *be* + (*shaped like* + noun phrase/a noun-shaped noun/an adjective organ): e.g. *The heart is shaped like a cone. The kidney is a bean-shaped organ. The heart is a conical organ.*

Statements of property: Noun phrase + *be* + adjective: e.g. *Monocytes are phagocytic.*

Connectives used in comparing and contrasting: *both ... and; neither ... nor; but, whereas, however, on the other hand*

Phrases of restatement: *i.e.; in other words*

Exemplification: *for example; e.g.*

Naming: *are called; is known as*

Notes

Shape in medicine is not always accurately expressed, especially in introductory descriptions. Writers use analogies which are often rather vague, but which give a rough idea.

SECTION 1

(See Introduction 6.1 for ways of dealing with exercises in the Presentation section)

The pattern presented in Exercise 1 can be extended widely to describe almost anything (e.g. *the patella is shaped like a disc/a yoghurt bowl; (a local mountain) is shaped like a pyramid/dome/cone*). Encourage your students to produce lots of their own examples—some of the analogies will be very amusing and you will get a good idea of their range of vocabulary.

Exercise 2 presents a pattern which can be used for any analogy except the common geometric shapes, for which we have adjectives derived from the nouns, e.g. *sphere—spherical*, cf. Exercise 3. Exercise 4 is designed to help the student see and practise this difference for himself. So, for example, we would not usually say *The lungs are cone-shaped organs*, but rather *The lungs are conical organs*. Further practice can be given by describing other organs of the body or items of everyday use (e.g. *an umbrella is J-shaped, or I-shaped*). Note that *sigmoid* = *like a sigma* (the Greek letter σ).

Answers to exercises

Exercise 1

a) ... a sphere. b) ... is shaped like a dome. c) ... are shaped like beans. d) ... are shaped like cones. e) ... is shaped like a pear. f) ... is shaped like a tube. g) ... is shaped like a triangle. h) ... is shaped like a pyramid.

Exercise 2

a) dome-shaped b) S-shaped c) duodenum d) kidneys

Exercise 3

a) The liver is triangular in shape. b) The eye is a small, spherical organ. c) The nose is pyramidal in shape. d) The kidneys are bean-shaped organs. e) The heart is conical in shape. f) The small intestine is a long, tubular organ.

Exercise 4

- a) The heart is shaped like a cone. The heart is conical in shape.
The eye is shaped like a sphere. The eye is a small spherical organ.
The liver is shaped like a triangle. The liver is triangular in shape.
- b) The kidneys are shaped like beans. The kidneys are bean-shaped organs.
The gallbladder is shaped like a pear. The gallbladder is a pear-shaped organ.
The diaphragm is shaped like a dome. The diaphragm is a dome-shaped organ.
- c) The oesophagus is shaped like a tube. The oesophagus is a tubular organ.
The lungs are shaped like cones. The lungs are conical in shape.
The duodenum is shaped like a tube (or like a letter C). The duodenum is a C-shaped organ (or a tubular organ).
The sigmoid colon is shaped like a letter S. The sigmoid colon is an S-shaped organ.
The small intestine is shaped like a tube. The small intestine is a long, tubular organ.

SECTION 2

(See Introduction 6.2 for Development exercises)

Exercise 5 presents various properties in the pattern: noun phrase + *be* + adjective. Note that in describing objects as a class or classifying objects we often use the plural form (e.g. *Monocytes are phagocytic*). As for the meaning of *permeable*, we should—strictly speaking—use *semi-permeable*, because not everything in the stomach can pass through the walls, but *permeable* is often used in this loose sense. Note also that it is the walls of capillaries, etc., which are permeable, not the cells which pass through them. Point out the ways of restating: *in other words*, and *i.e.* (which is often spoken as *that is*). Elicit further examples of the properties from your students. This exercise, incidentally, provides a good opportunity to do some work on word-building; e.g. *leuco-cyte* (white - cell), *erythro-cyte* (red - cell), *phago-cyt-ic* (eat - cell - adjectival ending), *amoeb-oid* (amoeba - like).

In Exercise 6 your students must first transfer the information in Exercise 5 to tabular form. Then, using the table, they practise simple ways of comparing and contrasting. Extend this practice by, using the tables only, having someone (you or a student) give a two-word prompt (e.g. *platelets - erythrocytes*) and the others produce a sentence comparing or contrasting the two (e.g. *Both platelets and erythrocytes are phagocytic.*). Extend this to the shapes practised in Exercises 1 to 4, (e.g. *heart - lungs; Both the heart and the lungs are conical.*).

Answers

Exercise 5

- a) ... flexible ... elastic. b) ... permeable. c) ... phagocytic. d) ... adhesive.
e) ... are flexible (and elastic). f) ... are impermeable. g) ... permeable h) ... are motile. i) ... are muscular (blood vessels). j) ... impermeable to erythrocytes.

Exercise 6

- a) ... veins are ... b) ... veins are not (elastic). c) ... arteries/veins have ...
d) ... leucocytes ... cannot usually pass through capillary walls. e) ... are impermeable
to leucocytes. f) ... erythrocytes nor platelets ... g) ... adhesive but/whereas ...
h) Erythrocytes/platelets ... property ... however/on the other hand ... move around
in the tissues. i) flexible ... however/on the other hand ...

SECTION 3

(See Introduction 6.3 for how to use the Reading section)

As this is the first passage you might feel the need to prepare the way a little, in which case here are some suggestions:

- have a short discussion about bacteria and see what your students know
- explain the system of naming bacteria by genus and species (e.g. *Bacillus megaterium*) and that the names of specific bacteria are written in *italics*; that the genus has a capital letter (*Bacillus*), but is not in italics if it refers to the genus as a whole (e.g. *Vibrio*) rather than as part of a specific name; (note that 'spirochaetes' in line 16 does not have a capital letter because it is an anglicized form of *Spirochaeta*). This can be an opportunity to practise the pronunciation of these strange names.

Now let your students read the passage—quickly, straight through. All they should be trying to do is to get a general idea of the passage and to label the four diagrams before the passage. After the first reading, check that everyone has labelled these correctly. Then have them look at the diagrams in Exercise 8 and tell them to read the passage again and label the various bacteria. When this is done they can transfer the information in the passage to the different form required by the classification diagram in Exercise 9. The completed versions of Exercises 8 and 9 will provide an opportunity for productive work, oral or written, in describing and classifying bacteria. Exercise 10 is an open-ended exercise intended to practise the kinds of descriptions practised earlier in the unit. The use of analogy should be encouraged.

Answers

Exercise 7

- a) ii b) iv c) i d) iii

Exercise 8

- a) *Vibrio comma* b) *Neisseria meningitidis* c) *Bacillus megaterium* d) *Diplococcus pneumoniae* e) *Spirillum volutans* f) *Clostridium sporogenes* g) *Spirochaeta stenostrepta*

Exercise 9

- a) 'cocci' e.g. *Diplococcus pneumoniae* (or *Neisseria meningitidis*)
b) 'bacilli' e.g. *Bacillus megaterium* (or *Clostridium sporogenes*)
c) spiral forms
d) *Vibrio* e.g. *Vibrio comma*
e) *Spirillum* e.g. *Spirillum volutans*
f) spirochaetes (or *Spirochaeta*) e.g. *Spirochaeta stenostrepta*

Exercise 10

Example descriptions:

Saprosira sp. are long and slender. They include straight, rod-shaped bacteria, rods with several curves in, and straight rods with a curve at the end.

Caulobacter sp. are short curved or comma-shaped rods. They are thicker in the centre and taper toward the end.

Streptomyces sp. is a long flexible organism, like a tree with many branches. The branches have many spirals.

SECTION 4

(See Introduction 6.4 for how to use the Listening section)

The Listening exercises aim to reinforce the work of the other three sections of the unit. Little preparation should be necessary for Exercise 10 because there is only one new word—polymorphonuclear—and this is explained in the passage. Read the passage a second time for Exercise 12, which requires the students to listen for descriptions of properties. Exercise 13 asks for descriptions of shape and property, using material from all parts of the unit.



Listening text

Now I'm going to say a little about blood cells. There are two main kinds of cells in the blood: red cells and white cells. The red cells, which are called erythrocytes, are rather small and have no nuclei. They are usually shaped like biconcave dishes but they can, however, change their shape to pass through the narrow parts of blood vessels.

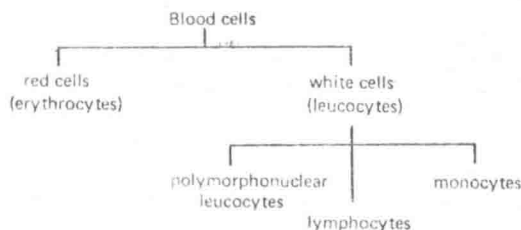
The white cells, which are known as leucocytes, include a number of various types. Some of them, for example, have nuclei which are irregular in shape: these are called polymorphonuclear leucocytes—*polymorpho-* because their nuclei have many (or *poly*) shapes (*morpho*). Now these kinds of cells can pass through capillary walls and move through the tissues, and many of them can eat and destroy foreign bacteria. But lymphocytes, on the other hand, are small—like the red cells—and round, and have large, regular nuclei.

And then finally there are monocytes, which are large round cells with oval nuclei. They also can move into the tissues and destroy foreign particles.

Answers

Exercise 11

a) lymphocytes b) monocytes c) erythrocytes d) polymorphonuclear leucocytes



Exercise 12

a) flexible and concave b) phagocytic and amoeboid c) phagocytic

Exercise 13

Example descriptions:

Erythrocytes are small flexible cells with no nuclei. The sides are concave, or in other words, the cell is thinner in the middle than at the ends.

Polymorphonuclear leucocytes have nuclei with irregular shapes. They are phagocytic and amoeboid.

Lymphocytes are small round cells with large round nuclei.

Monocytes are large round cells with small nuclei. They are phagocytic.

UNIT 2 Location

Aims

To extend ways of describing parts of the body by practising expressions of location. To practise the main anatomical terms of location.

Main language items

Statements of position:

be + prepositional phrase: e.g. The gallbladder is below the liver.

Anatomical terms for position:

their use as adjectives: e.g. *inferior vena cava*;

in prepositional phrases: e.g. *The gallbladder is inferior to the liver.*

As adverbs: e.g. *The liver is in contact inferiorly with the gallbladder.*

Stative verbs associated with position: *be located, situated, related; lies, extends, etc.*

Definition by description of position: e.g. *This is an organ which lies in front of the oesophagus.*

Notes

The Presentation section presents non-technical terms of location and the Development section presents technical terms (i.e. the anatomical terms). Both sets of terms are used in medical texts, usually together in any given passage.

SECTION 1

In Exercise 1 use objects or pictures to give lots of practice with these common terms, and practise *to the left/right of* and *between* with students in the class. Note that *between* can have two different meanings: in terms of space alone (e.g. *The small intestine lies between the ascending and descending colon.*), and in terms of a system or progression (e.g. *The small intestine lies between the stomach and the large intestine.*). In the diagram of the body, *right* and *left* are used in their usual medical sense of right and left of the body, not of the diagram. Note also that in the diagrams a broken line means that it represents an organ which lies behind another one. In this first diagram the position of the organs has been altered slightly to make the initial presentation simpler (Exercise 12 gives a more accurate picture). Practice can be extended using the heart and lungs, the eyes, nose and mouth, and other parts of the body (giving you chance to revise expressions of shape and property).

Practise the terms in Exercise 2 extensively as in Exercise 1, and describe the skeletons using terms from both exercises. In Exercise 3 the order of the prompts is very important and determines the answer. You can extend the practice after completion by giving quick oral prompts either as in the exercise but in random order, or in reverse order to elicit the opposite way of expressing the relationship, or with different prompts (from Exercises 1 and 2, or others). But make sure they are sensibly close: a statement like *The heart is above the rectum* is certainly true but not particularly useful or likely as a statement. The organs described in Exercise 4 can be found on the diagrams in Exercises 1 and 2. You can extend this practice by giving descriptions of unnamed organs for your students to name, and then getting your students to describe the same or other organs (or objects).

Answers to exercises

Exercise 1

a) the spleen b) The spleen/The transverse colon... c) ... the ascending colon and the descending colon./... the transverse colon... the sigmoid colon./... the stomach... the ascending colon. d) The stomach... e) below f) to the left of g) above h) the stomach/the gallbladder/the liver i) The sigmoid colon/The rectum... j) the liver... above

Exercise 2

a) the sternum b) The oesophagus c) the vertebral column d) The sacrum and the coccyx e) The kidneys f) the twelfth thoracic vertebra g) surround

Exercise 3

The questions are as in the example, substituting for *the sternum* and *the heart*.

- a) The sacrum lies immediately above the coccyx.
- b) The rectum is located at the (bottom) end of the large intestine.
- c) The vertebral column lies behind the heart.
- d) The larynx is located in front of the vertebral column at the top of (or above) the trachea.
- e) The top of the left kidney lies at the level of the 11th rib.
- f) The liver is located below the diaphragm and to the right of the stomach.
- g) The lungs are within the ribs.
- h) The duodenum lies below and to the left of the liver, above and behind the transverse colon, and to the right of the pancreas.

Exercise 4

a) the larynx b) the appendix c) the pancreas d) the caecum

SECTION 2

If you can get hold of a skeleton (or an anatomical model), this could greatly enliven the presentation of anatomical terms in Exercise 5 and later practice. Otherwise demonstrate the anatomical position with a willing student. Give extra practice questions after each term; here are some suggestions: for *anterior/posterior* -- heart + vertebral column,