

Anatomy (解剖學)

【dissection】

一門研究身體結構及其相對位置的科學

What are their forms? How are they arranged?

Physiology (生理學)

一門研究這些身體結構功能的科學

What do they do? How do they do it?

the Greek words "physis" meaning *nature* and
"logia" meaning *knowledge*

TABLE 1.1 Selected Subdisciplines of Anatomy and Physiology

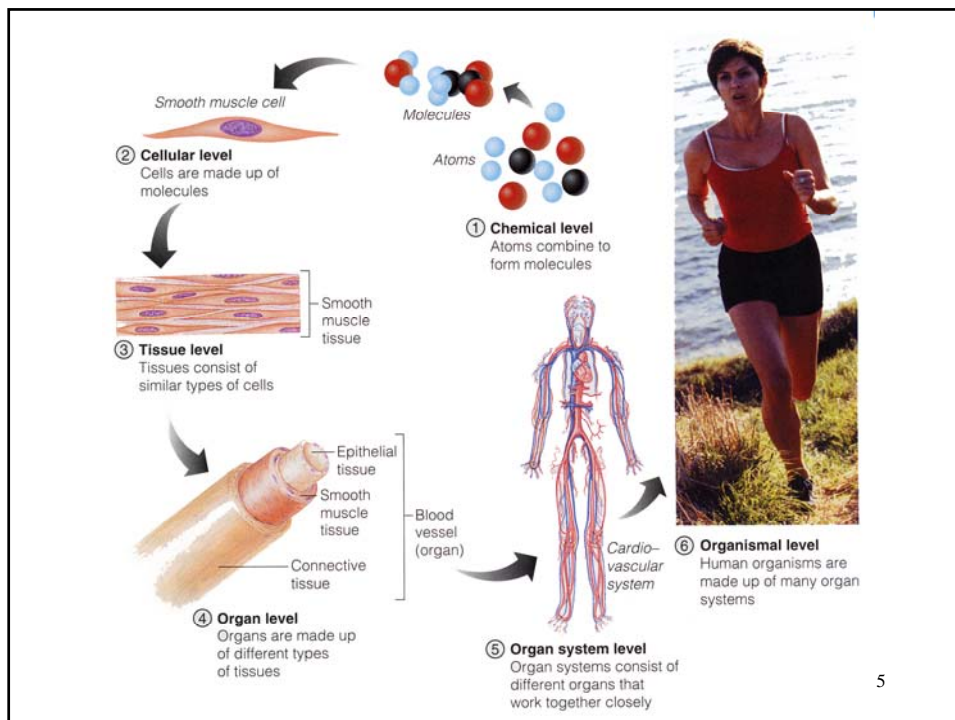
Subdisciplines of Anatomy	Study of	Subdisciplines of Physiology	Study of
Embryology (em'-brē-OL-ō-jē; embryo- = embryo; -logy = study of)	Structures that emerge from the time of the fertilized egg through the eighth week in utero.	Neurophysiology (NOOR-ō-fiz-ē-ol'-ō-jē; neuro- = nerve)	Functional properties of nerve cells.
Developmental biology	Structures that emerge from the time of the fertilized egg to the adult form.	Endocrinology (en'-dō-kri-NOL-ō-jē; endo- = within; -crin = secretion)	Hormones (chemical regulators in the blood) and how they control body functions.
Histology (his'-TOL-ō-jē; hist- = tissue)	Microscopic structure of tissues.	Cardiovascular physiology (kar-dē-ō-VAS-kō-lar; cardi- = heart; -vascular = blood vessels)	Functions of the heart and blood vessels.
Surface anatomy	Anatomical landmarks on the surface of the body through visualization and palpation.	Immunology (im'-ū-NOL-ō-jē; immun- = not susceptible)	How the body defends itself against disease-causing agents.
Gross anatomy	Structures that can be examined without using a microscope.	Respiratory physiology (RES-pir-a-to'-rē; respira- = to breathe)	Functions of the air passageways and lungs.
Systemic anatomy	Structure of specific systems of the body such as the nervous or respiratory systems.	Renal physiology (RE-nal; ren- = kidney)	Functions of the kidneys.
Regional anatomy	Specific regions of the body such as the head or chest.	Exercise physiology	Changes in cell and organ functions as a result of muscular activity.
Radiographic anatomy (rā-dē-ō-GRAF-ik; radio- = ray; -graphic = to write)	Body structures that can be visualized with x rays.	Pathophysiology (PATH-ō-fiz-ē-ol'-ō-jē)	Functional changes associated with disease and aging.
Pathological anatomy (path'-ō-LOJ-i-ka; path- = disease)	Structural changes (from gross to microscopic) associated with disease.		

3

生理功能之結構層次

- ❖ 化學層次 (chemical level)
- ❖ 細胞層次 (cellular level)
- ❖ 組織層次 (tissue level)
- ❖ 器官層次 (organ level)
- ❖ 系統層次 (system level)
- ❖ 生物體層次 (organism level)

4



5

Anatomical Terminology

- ❖ **Anatomical position**
- ❖ **Anatomical direction**
 - 1. Superior & Inferior**
 - 2. Anterior (ventral) & Posterior (dorsal)**
 - 3. Medial & Lateral**
 - 4. Proximal & Distal**
 - 5. Superficial & Deep**

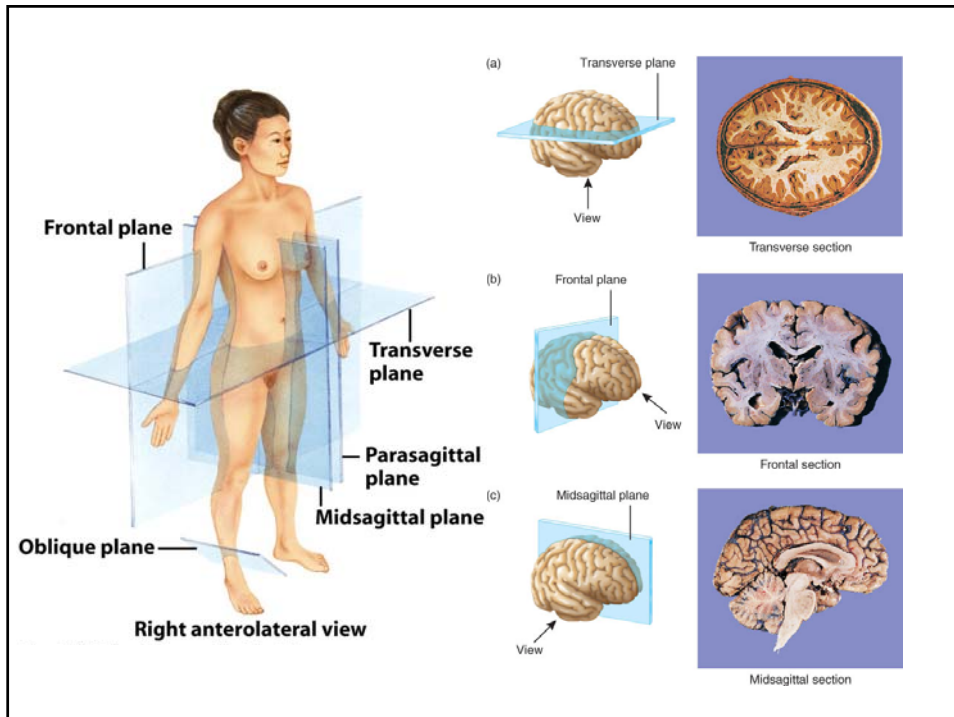
6

Anatomical Terminology

❖ Anatomical section

1. Midsagittal plane & Sagittal plane
2. Frontal plane (Coronal plane)
3. Transverse plane (Horizontal plane)

7



Body Cavities

❖ Ventral body cavities:

-- Thoracic cavity (胸腔)

Mediastinum cavity (縱膈腔)

Pleural cavity (胸膜腔)

Pericardial cavity (心包腔)

-- Abdominal cavity (腹腔)

-- Pelvic cavity (骨盆腔)

❖ Dorsal body cavities:

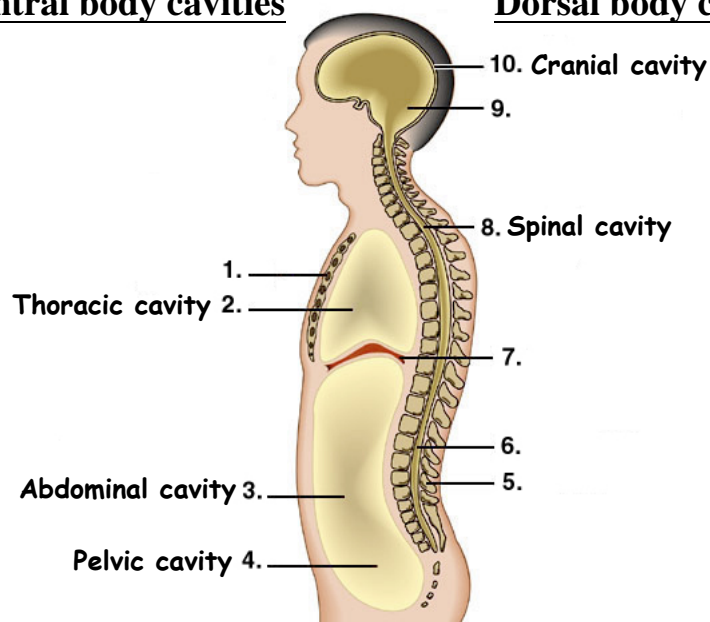
-- Cranial cavity (顱腔)

-- Spinal cavity (脊髓腔)

9

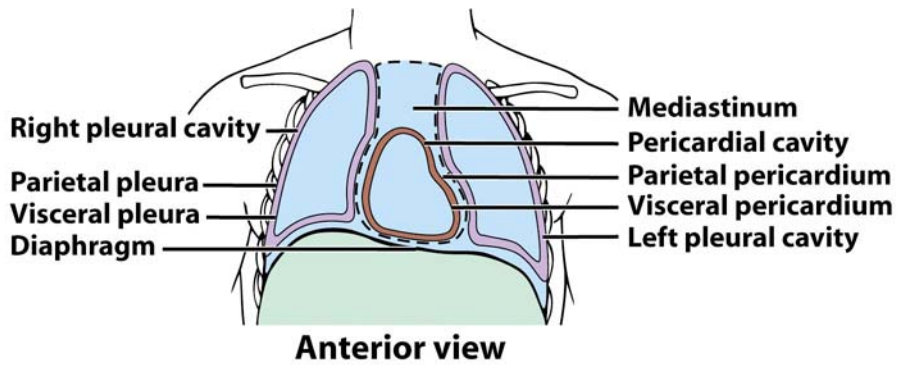
Ventral body cavities

Dorsal body cavities



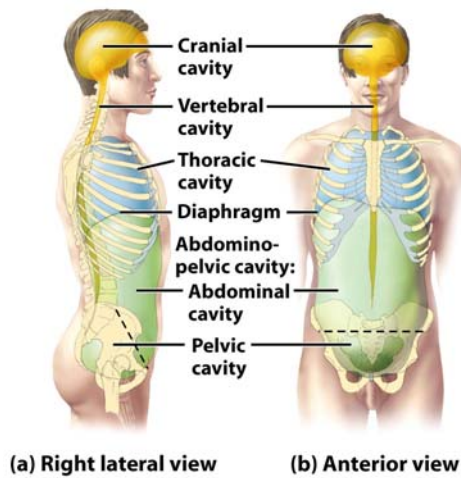
10

Thoracic Cavity



11

Body Cavities



(a) Right lateral view

(b) Anterior view

CAVITY	COMMENTS
Cranial cavity	Formed by cranial bones and contains brain.
Vertebral cavity	Formed by vertebral column and contains spinal cord and the beginnings of spinal nerves.
Thoracic cavity*	Chest cavity; contains pleural and pericardial cavities and mediastinum.
<i>Pleural cavity</i>	Each surrounds a lung; the serous membrane of the pleural cavities is the pleura.
<i>Pericardial cavity</i>	Surrounds the heart; the serous membrane of the pericardial cavity is the pericardium.
<i>Mediastinum</i>	Central portion of thoracic cavity between the lungs; extends from sternum to vertebral column and from neck to diaphragm; contains heart, thymus, esophagus, trachea, and several large blood vessels.
Abdominopelvic cavity	Subdivided into abdominal and pelvic cavities.
<i>Abdominal cavity</i>	Contains stomach, spleen, liver, gallbladder, small intestine, and most of large intestine; the serous membrane of the abdominal cavity is the peritoneum.
<i>Pelvic cavity</i>	Contains urinary bladder, portions of large intestine, and internal organs of reproduction.

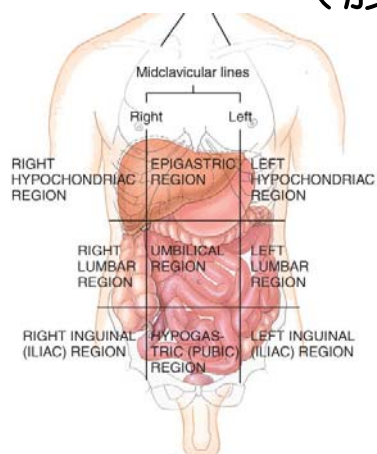
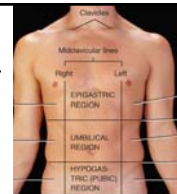
12

Abdominopelvic Cavity (腹骨盆腔)

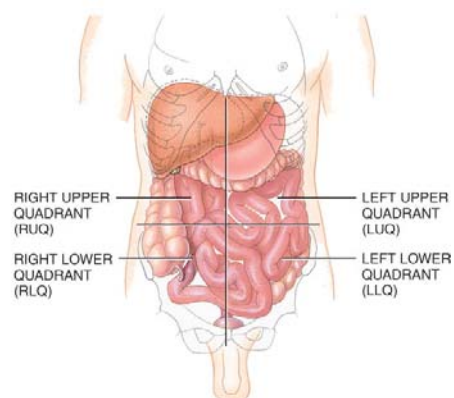
- ❖ **Upper abdominopelvic regions**
 - 左右季肋區及上腹區 (epigastric region)
- ❖ **Middle abdominopelvic regions**
 - 左右腰區及臍區 (umbilical region)
- ❖ **Lower abdominopelvic regions**
 - 左右鼠蹊區 (腹股溝區) 及下腹區 (hypogastric region)

13

Abdominopelvic Cavity (腹骨盆腔)



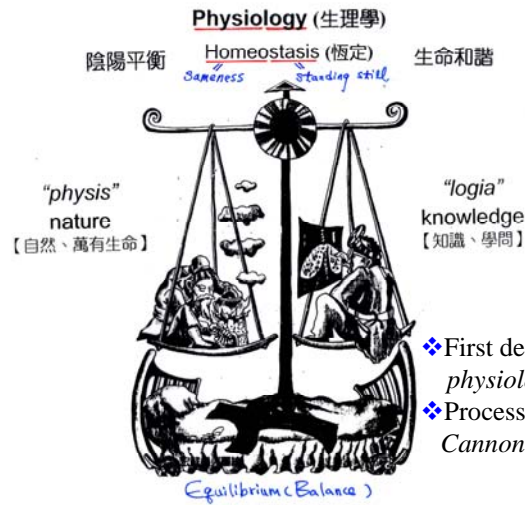
(b) Anterior view showing location of abdominopelvic regions



(c) Anterior view showing location of abdominopelvic quadrants

14

Homeostasis

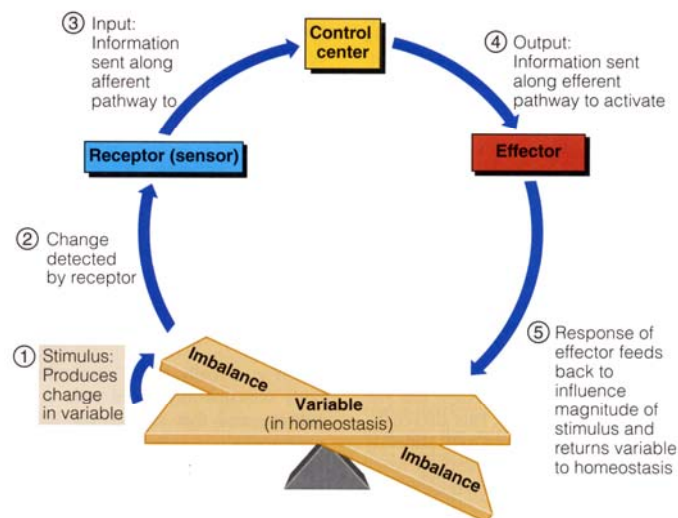


- ❖ First described by French physiologist, 1813-1878
- ❖ Process named by Walter Cannon, 1871-1945

Homeostasis is a condition of equilibrium in the body's internal environment produced by the ceaseless interplay of all the body's regulatory processes

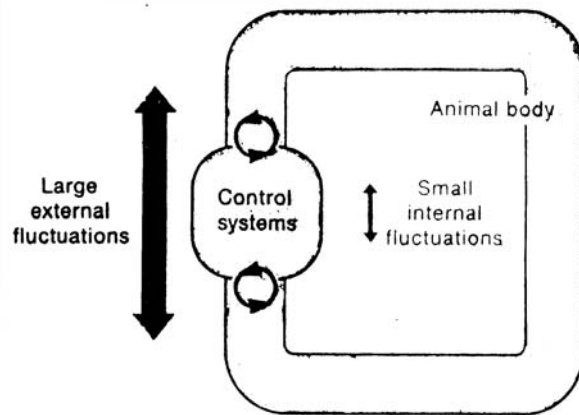
15

Control Mechanism: Receptor + Control center + Effector



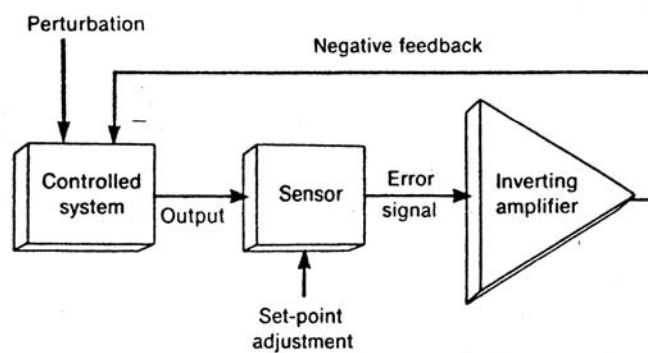
16

Control Mechanism: Receptor + Control center + Effector

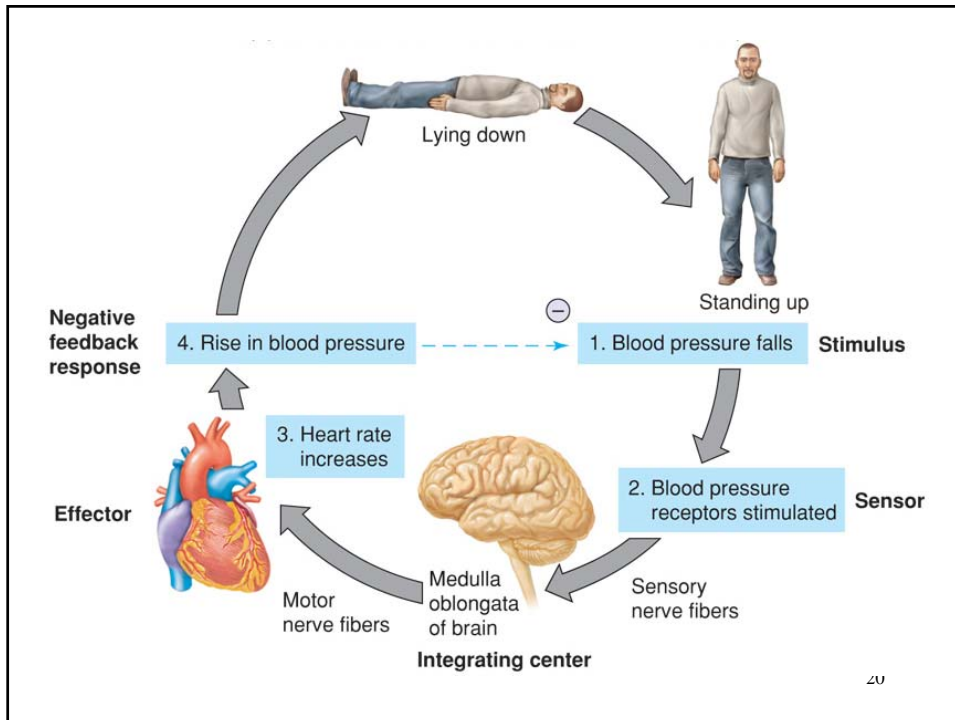
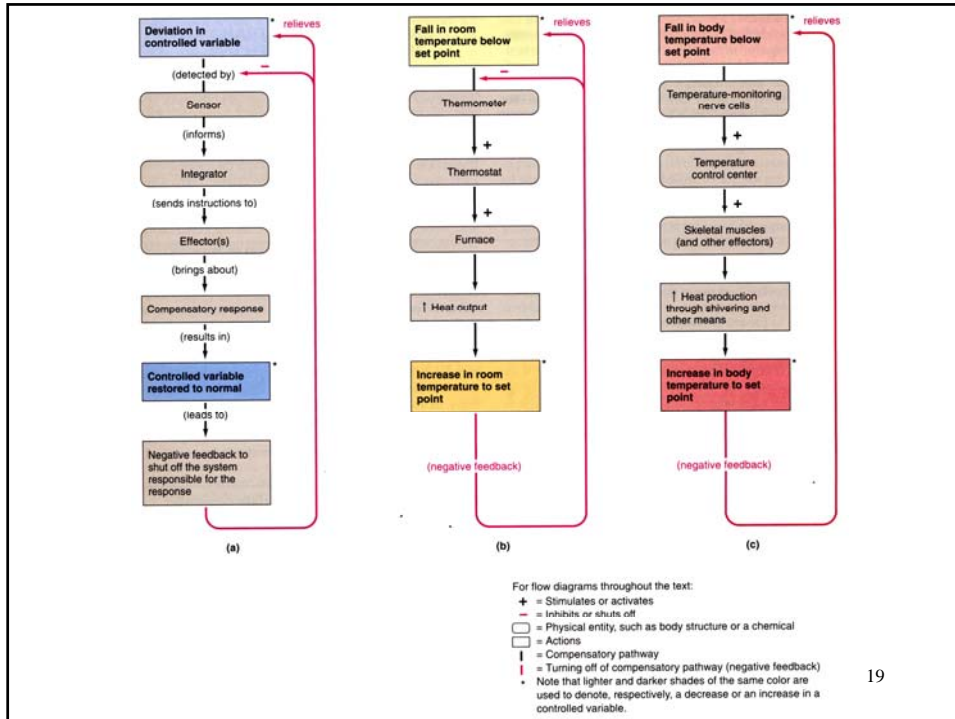


17

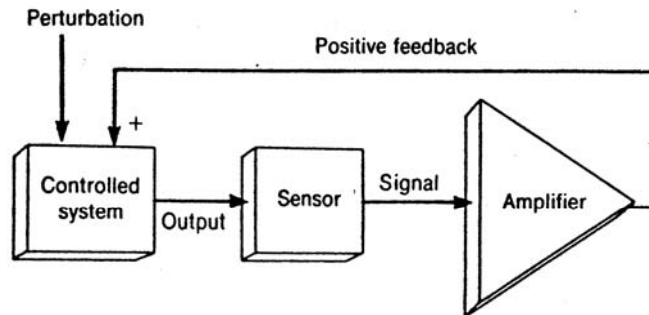
Negative Feedback



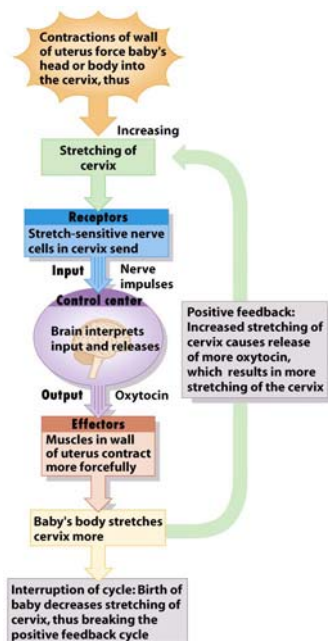
18



Positive Feedback



21



- ❖ Stretch receptors in walls of the uterus send signals to the brain
- ❖ Brain releases a hormone (oxytocin) into bloodstream
- ❖ Uterine smooth muscle contracts more forcefully
- ❖ More stretch → more hormone → more contraction → etc.
- ❖ The cycle ends with birth of the baby & decrease in stretch

22

Homeostatic Imbalances

- ❖ Disruption of homeostasis can lead to disease and death.
- ❖ **Disorder** is a general term for any derangement of abnormality of function.
- ❖ **Disease** is a more specific term for an illness characterized by a recognizable set of signs and symptoms.
 - A local disease is one that affects one part or a limited region of the body.
 - A systemic disease affects either the entire body or several parts.

23

Table 1.1 Orientation and Directional Terms			
Term	Definition	Illustration	Example
Superior (cranial or cephalad)	Toward the head end or upper part of a structure or the body; above		The forehead is superior to the nose.
Inferior (caudal)	Away from the head end or toward the lower part of a structure or the body; below		The navel is inferior to the breastbone.
Anterior (ventral)*	Toward or at the front of the body; in front of		The breastbone is anterior to the spine.
Posterior (dorsal)*	Toward or at the backside of the body; behind		The heart is posterior to the breastbone.
Medial	Toward or at the midline of the body; on the inner side of		The heart is medial to the arm.
Lateral	Away from the midline of the body; on the outer side of		The arms are lateral to the chest.
Intermediate	Between a more medial and a more lateral structure		The armpit is intermediate between the breastbone and shoulder.
Proximal	Close to the origin of the body part or the point of attachment of a limb to the body trunk		The elbow is proximal to the wrist (meaning that the elbow is closer to the shoulder or attachment point of the arm than the wrist is).
Distal	Farther from the origin of a body part or the point of attachment of a limb to the body trunk		The knee is distal to the thigh.
Superficial	Toward or at the body surface		The skin is superficial to the skeleton.
Deep	Away from the body surface; more internal		The lungs are deep to the rib cage.

*Ventral and anterior are synonymous in humans; this is not the case in four-legged animals. Ventral refers to the "belly" of an animal and thus is the inferior surface of four-legged animals. Likewise, although the dorsal and posterior surfaces are the same in humans, the term dorsal refers to an animal's back. Thus, the dorsal surface of four-legged animals is their superior surface.

24

幸福的地方

有一天，小獅子問它的媽媽：「幸福在什麼地方？」

獅子媽媽說：「幸福就在你的尾巴上。」

於是，小獅子不停地追著自己的尾巴。

不過，它追了一整天也追不到...

它把這情形告訴媽媽。

獅子媽媽笑說：「其實你不用刻意找尋幸福，只要你一直向前走，幸福便會自然的跟著你！」