

# Le Systeme International d'Unites

## Table 2.1 SI base units

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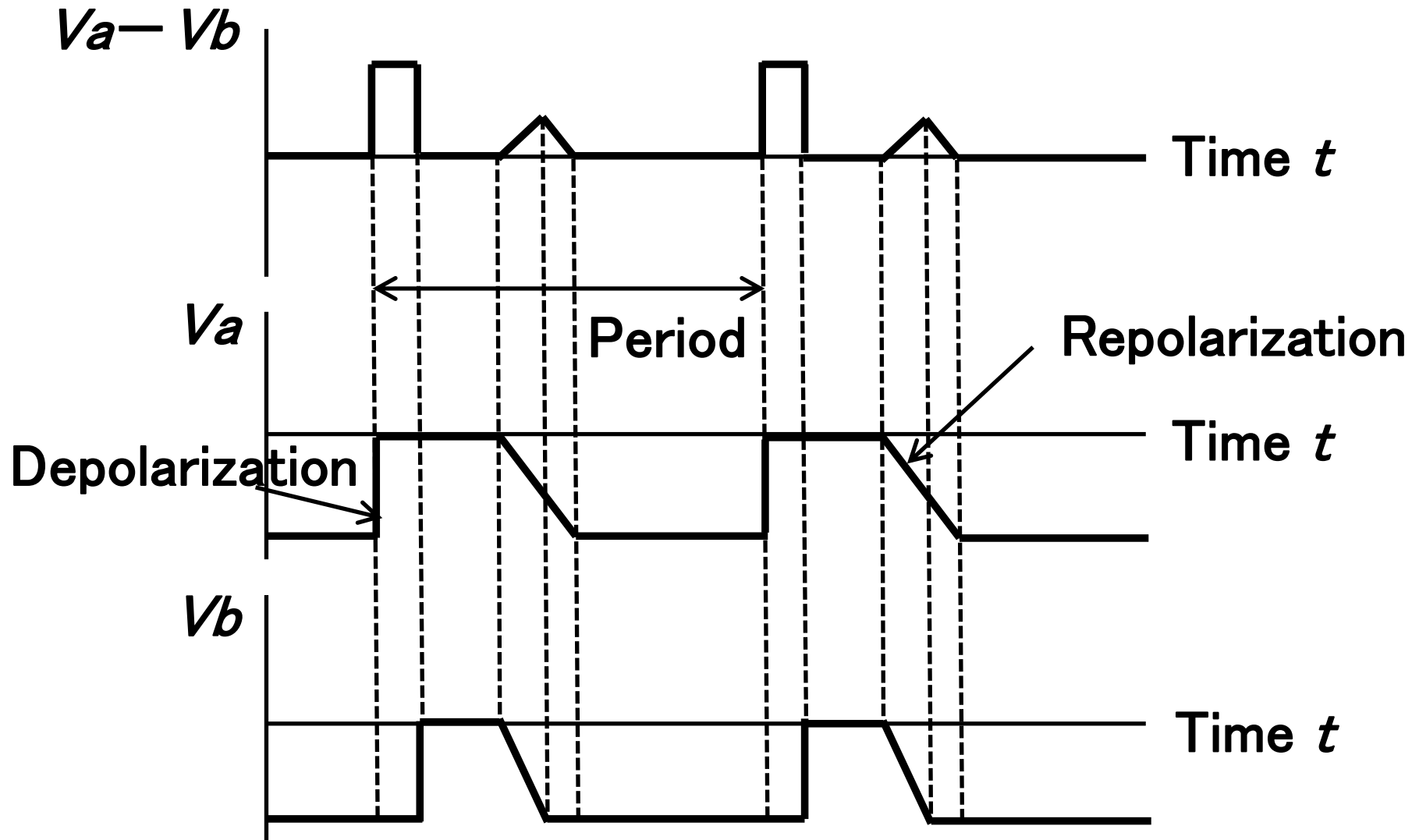
Value	Symbol (Name)	Definition
Time	s (second)	periods of the radiation of caesium
Length	m (meter)	velocity of light in vacuum
Mass	kg (kilogram)	international prototype
Electric current	A (ampere)	Force between conductors
Temperature	K (kelvin)	Triple point of water
Amount of a substance	mol (mole)	atoms in 0.012 kilogram of carbon 12
Luminous intensity	cd (candela)	radiation of frequency $540 \times 10^{12}$ hertz

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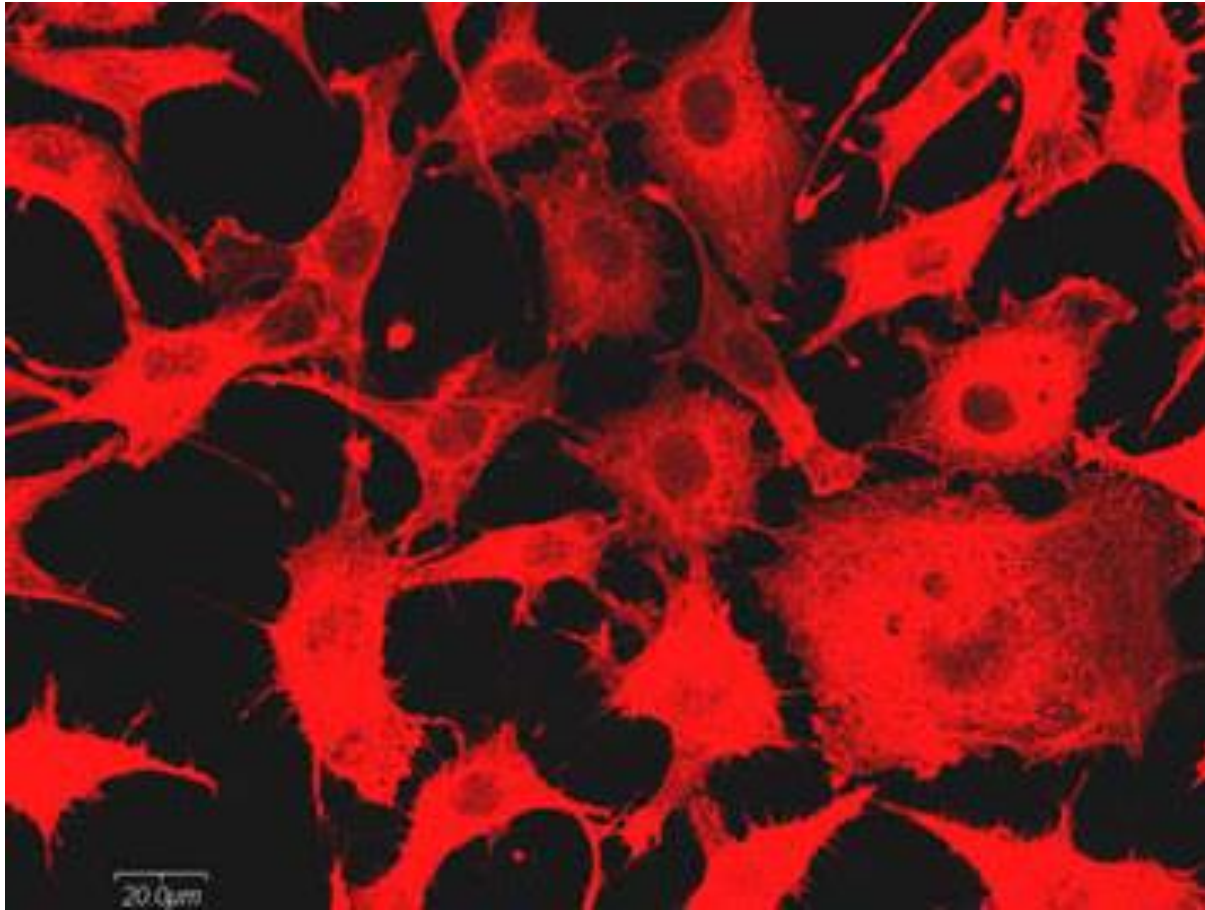
# Table 2.2 Powers of ten and unit prefixes

Prefix (Name) power times	Prefix (Name) power times
<b>Y (yotta)</b> $\times 10^{24}$	<b>D (deci)</b> $\times 10^{-1}$
<b>Z (zetta)</b> $\times 10^{21}$	<b>c (centi)</b> $\times 10^{-2}$
<b>E (exa)</b> $\times 10^{18}$	<b>m (mili)</b> $\times 10^{-3}$
<b>P (peta)</b> $\times 10^{15}$	<b><math>\mu</math> (micro)</b> $\times 10^{-6}$
<b>T (tera)</b> $\times 10^{12}$	<b>n (nano)</b> $\times 10^{-9}$
<b>G (giga)</b> $\times 10^9$	<b>p (pico)</b> $\times 10^{-12}$
<b>M (mega)</b> $\times 10^6$	<b>f (femto)</b> $\times 10^{-15}$
<b>K (kilo)</b> $\times 10^3$	<b>a (atto)</b> $\times 10^{-18}$
<b>H (hecto)</b> $\times 10^2$	<b>z (zepto)</b> $\times 10^{-21}$
<b>Da (deka)</b> $\times 10$	<b>y (yocto)</b> $\times 10^{-24}$

# Fig. 2.1: Principle of electrocardiograph



# Fig. 2.2: Immuno-staining



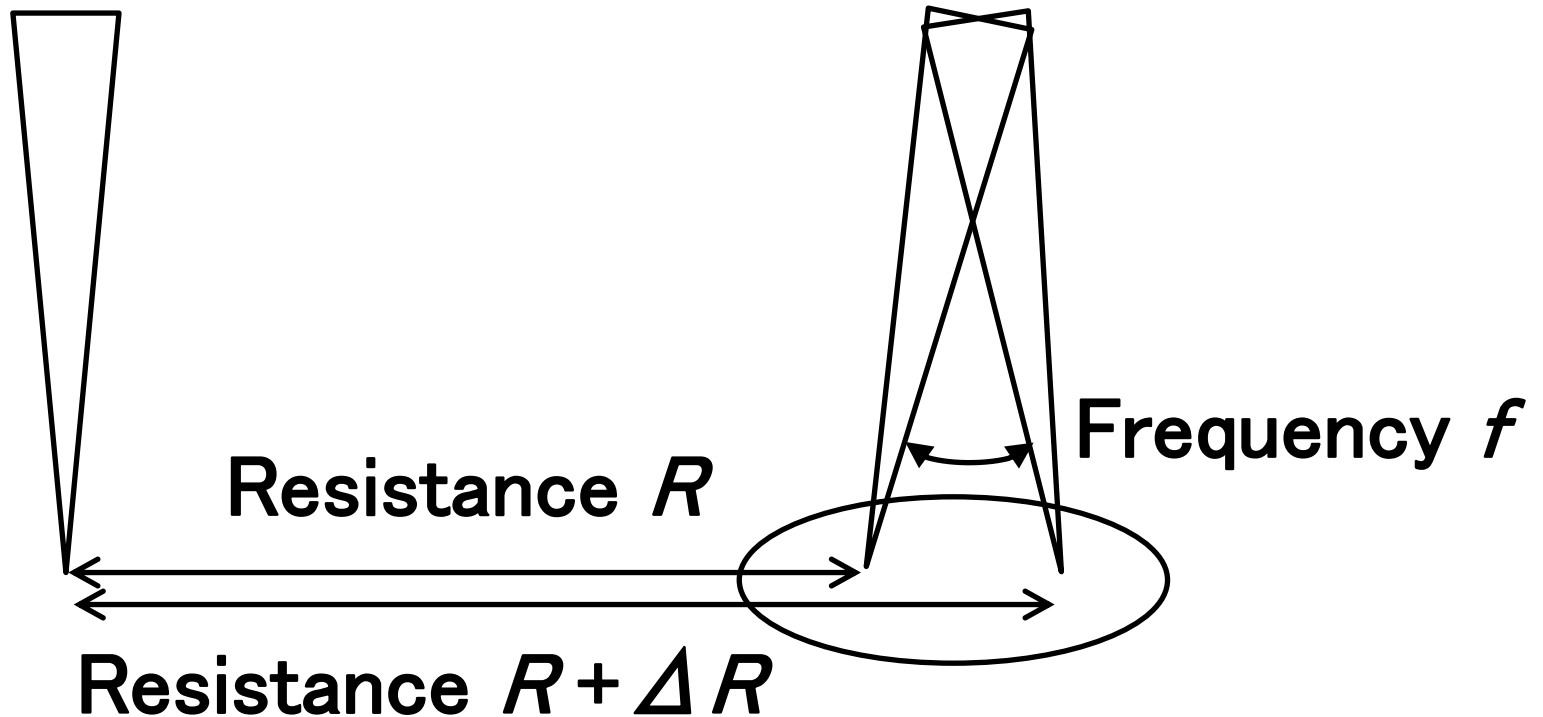
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**0.1 mm**

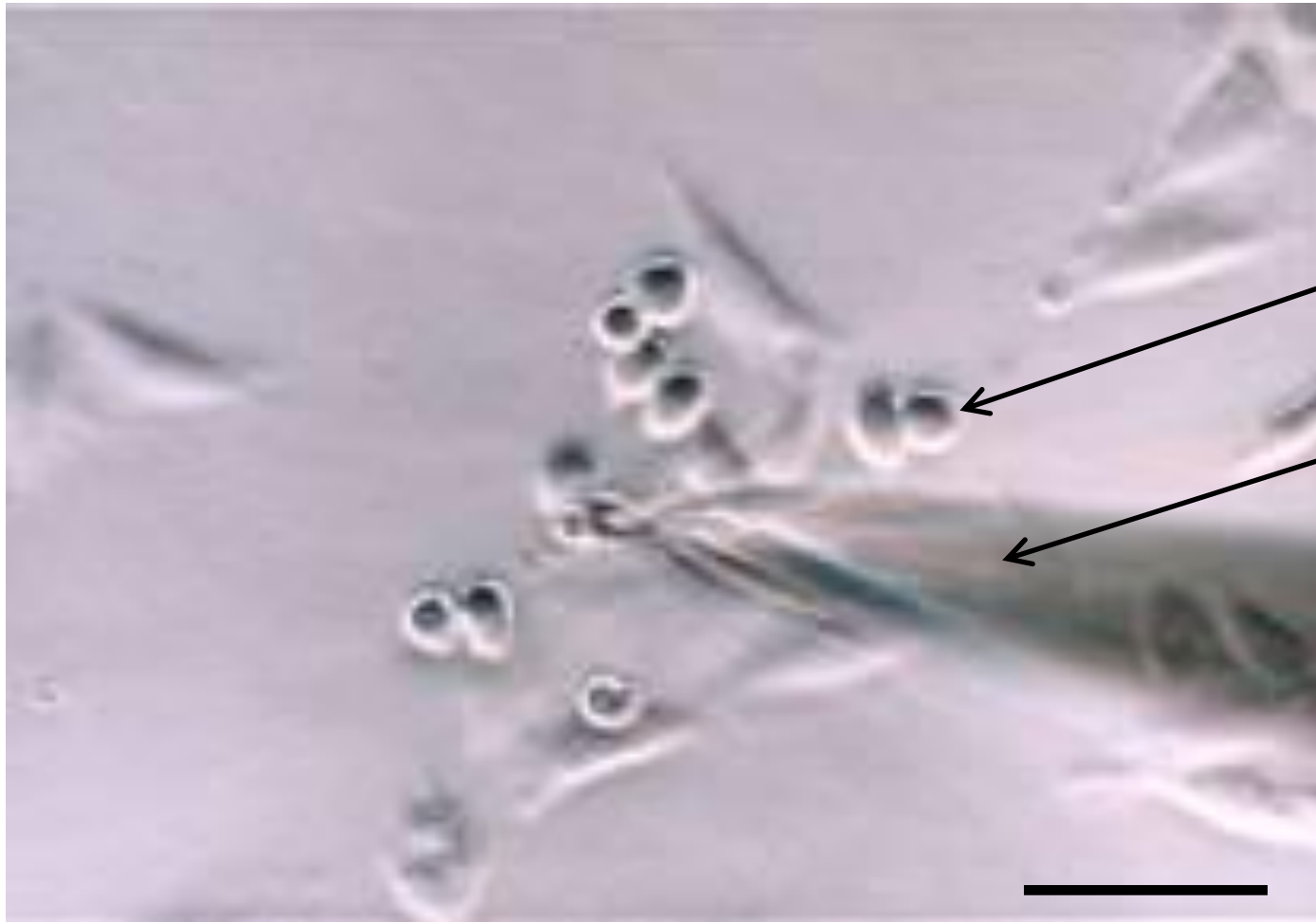
# Fig. 2.3(a): Vibrating electrode

[Fixed electrode]

[Vibrating electrode]



# Fig. 2.3(b): Vibrating electrode

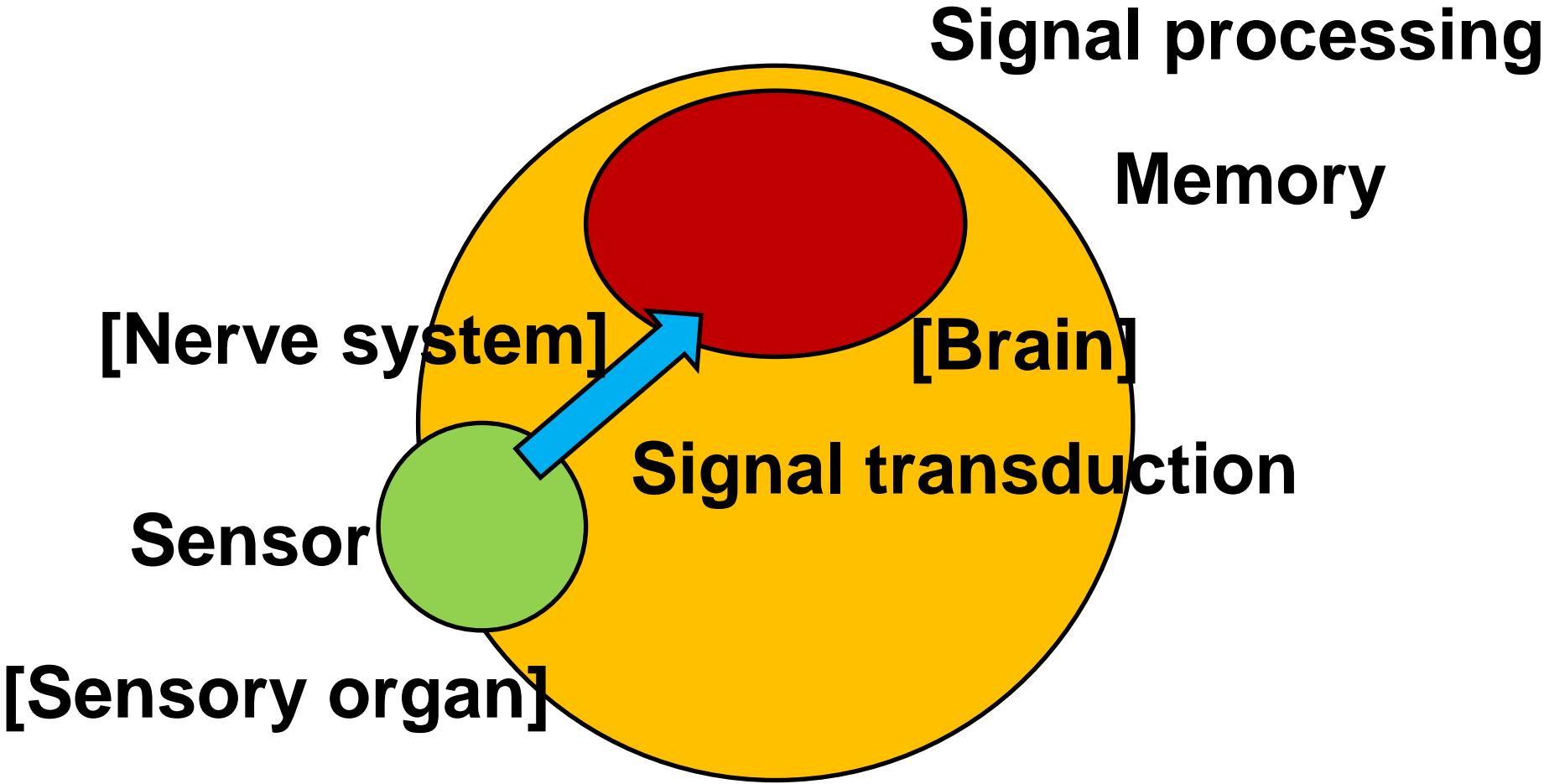


Cell

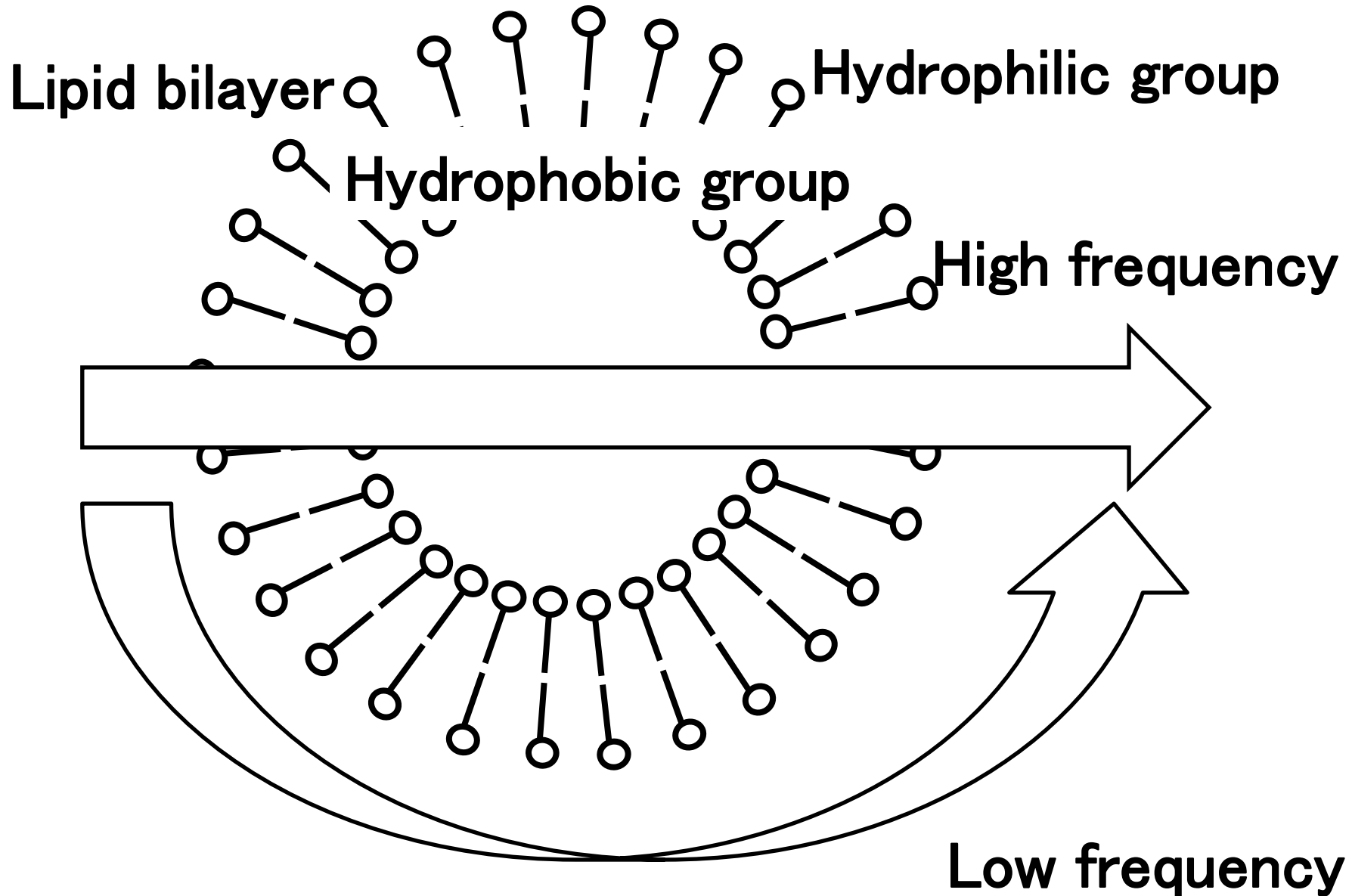
Electrode

0.05 mm

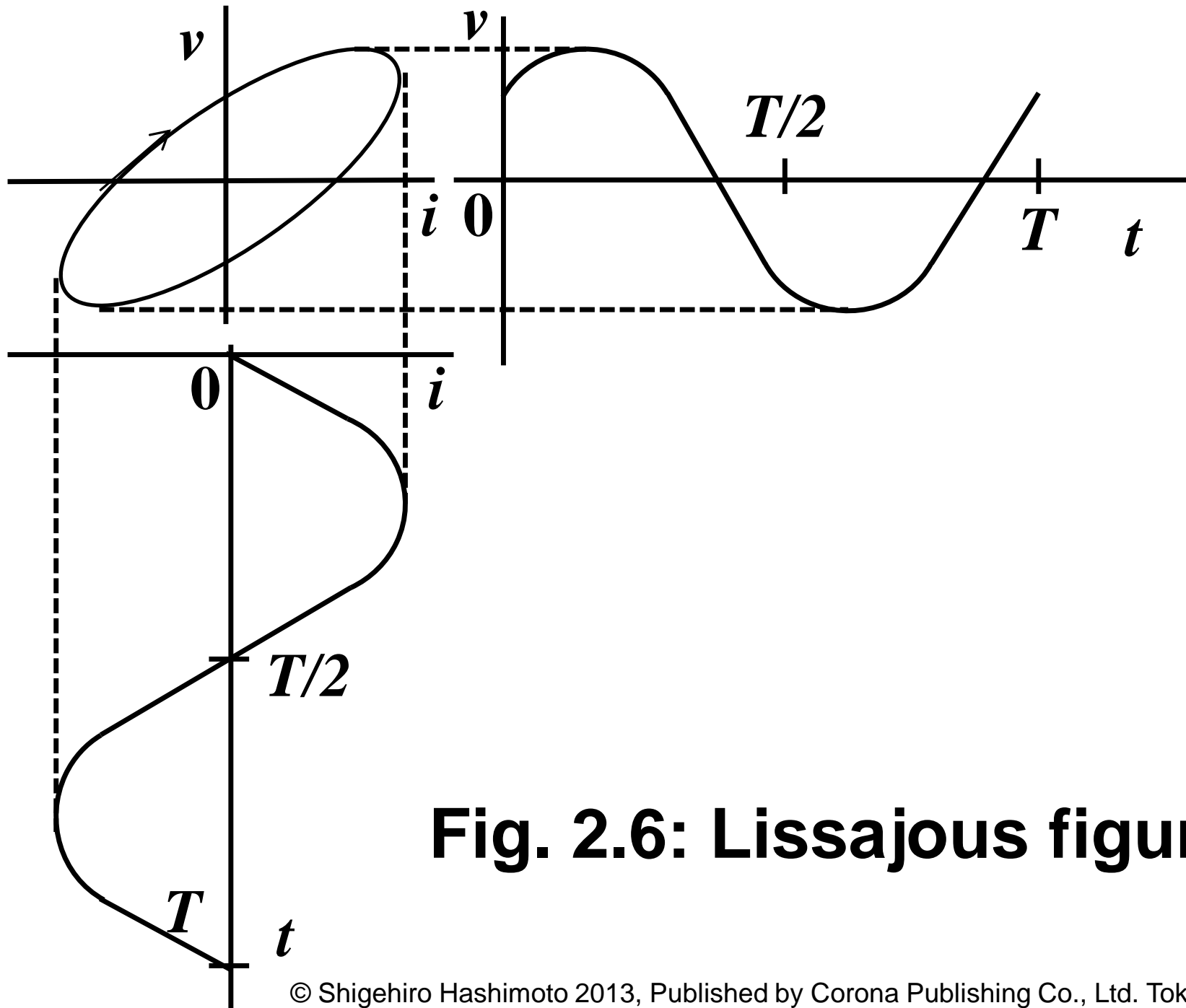
# Fig. 2.4: Biological system



# Fig. 2.5: Electric current through lipid bilayer

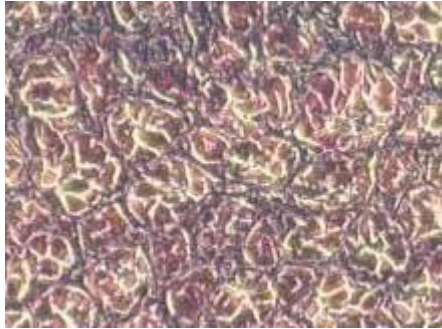




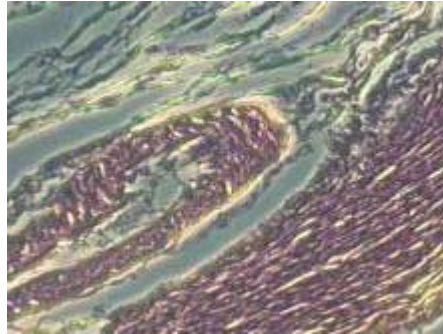


**Fig. 2.6: Lissajous figure**

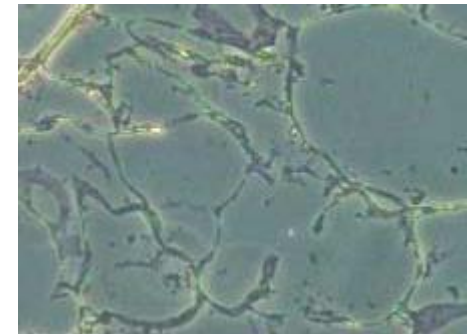
# Fig. 2.7: Tissue grouping



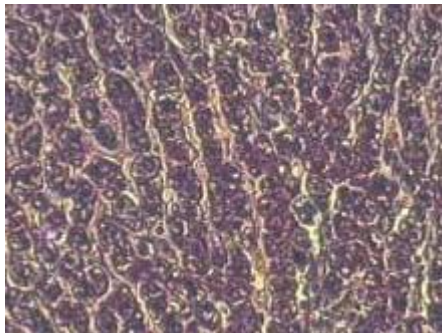
**Kidney**



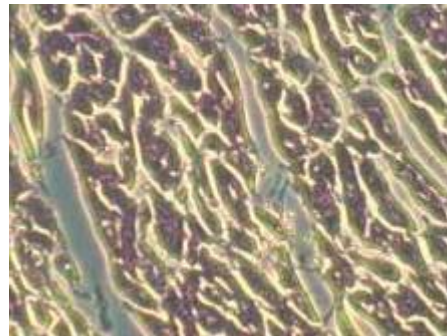
**Intestinal mucosa**



**Fat**



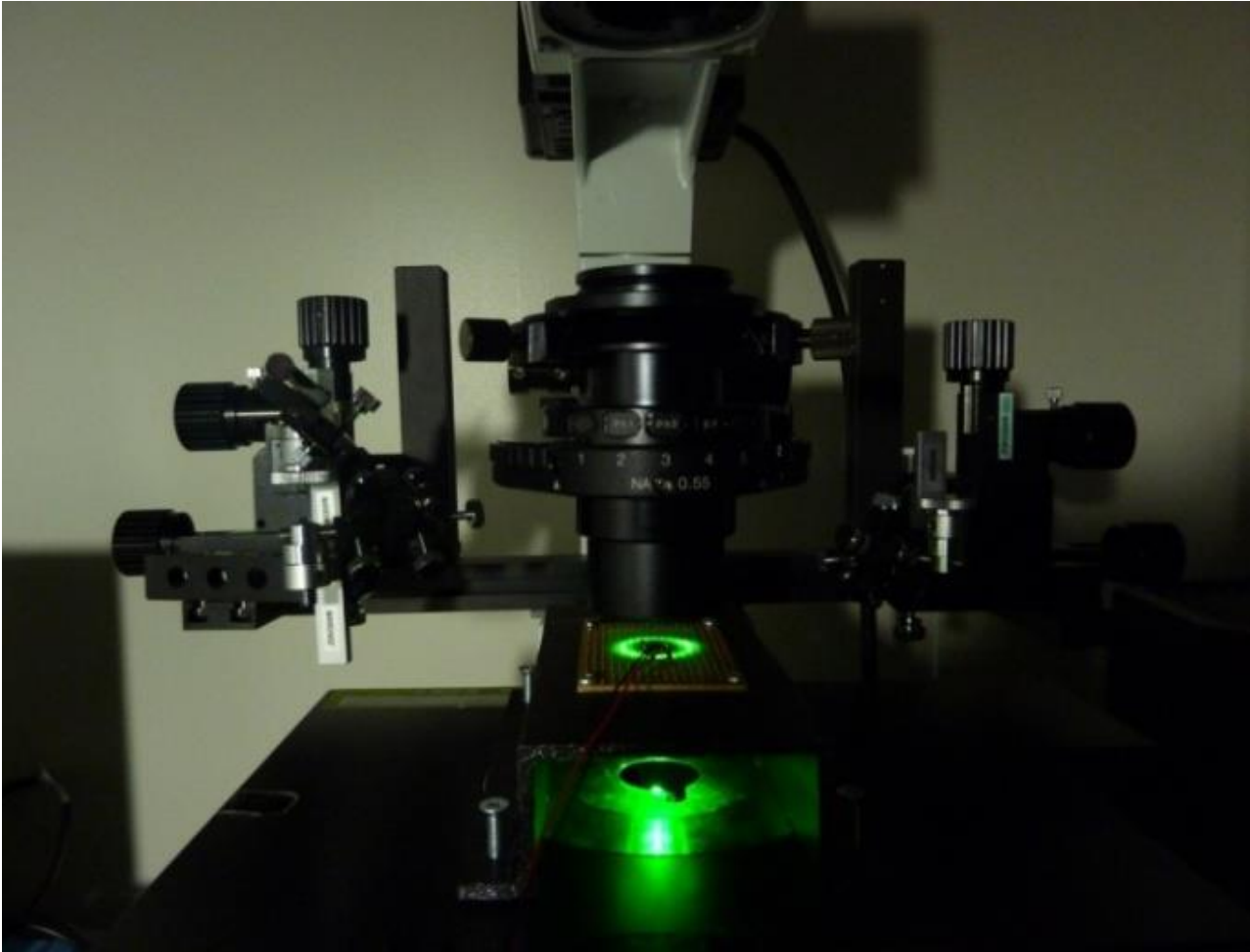
**Liver**



**Cardiac muscle**

**0.1 mm**

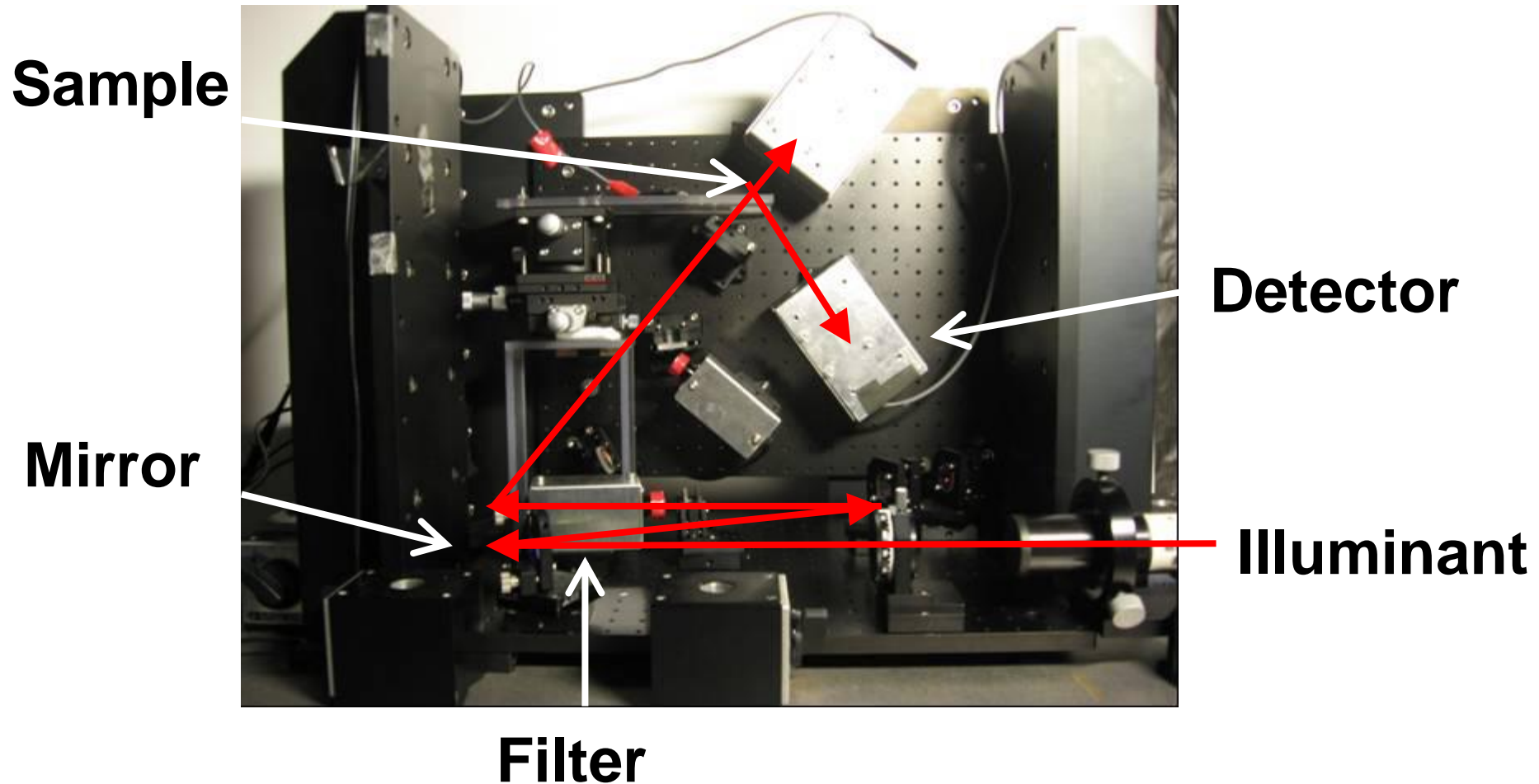
# Fig. 2.8: pH measurement with light



**Microscope**

**Illuminant**

# Fig. 2.9: Measurement with laser

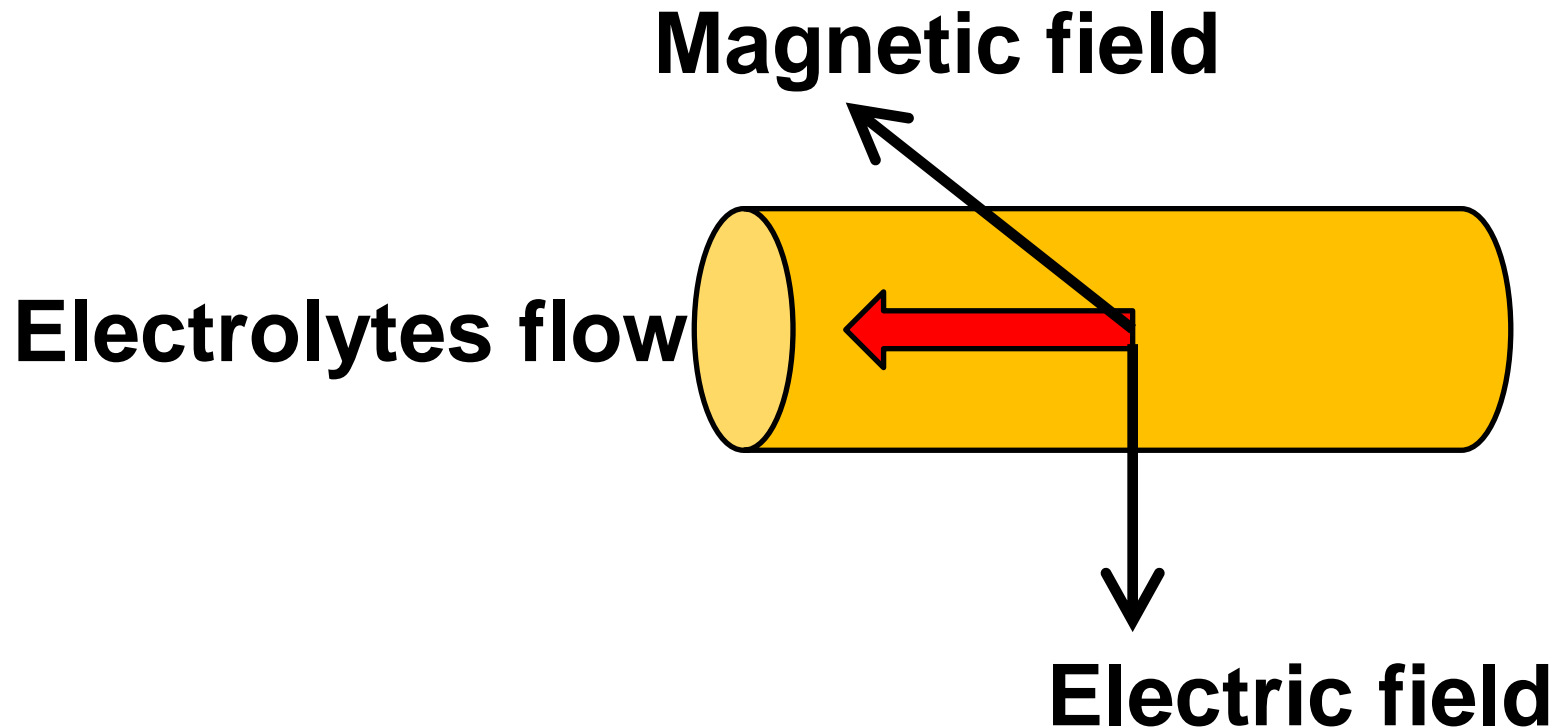


# Fig. 2.10: Measurement of skin temperature with infra-red ray

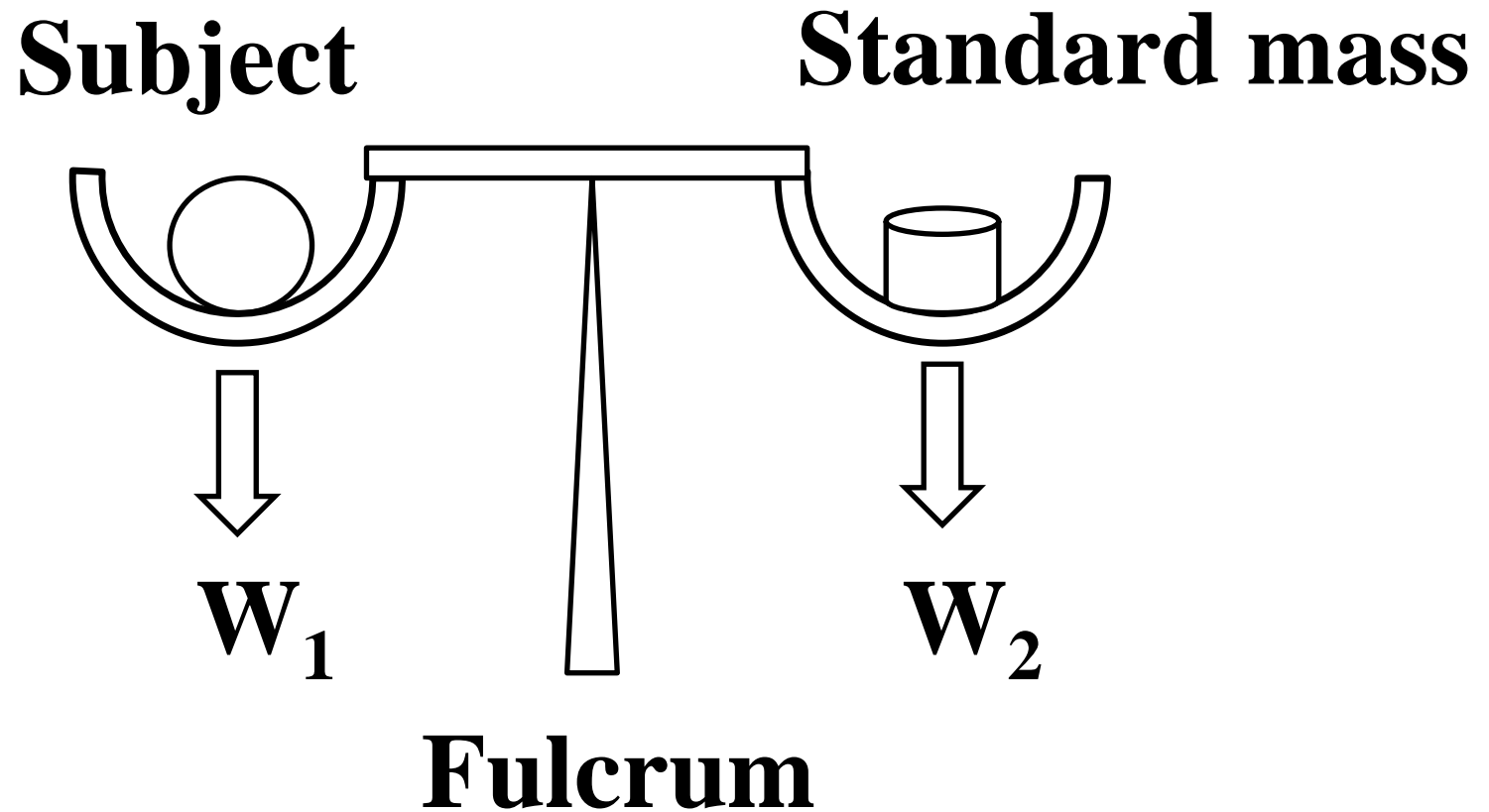
**Light source &  
Detector**



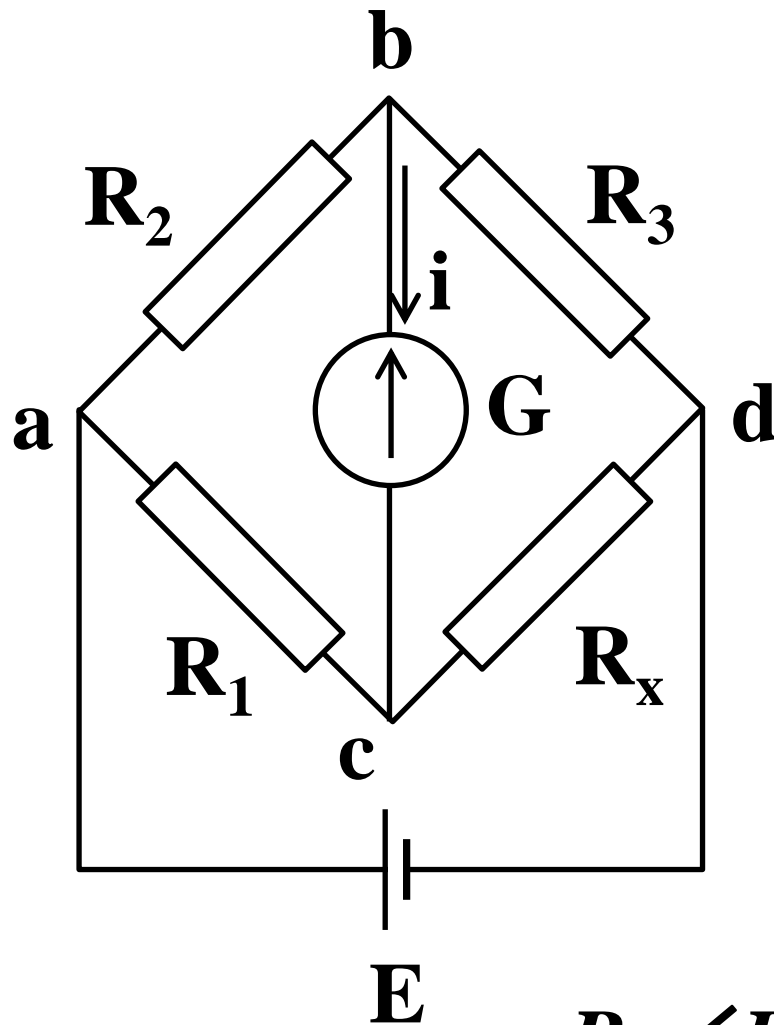
# Fig. 2.11: Principle of electromagnetic flowmeter



# Fig. 2.12: Gravitational equilibrium



# Fig. 2.13: Wheatstone bridge

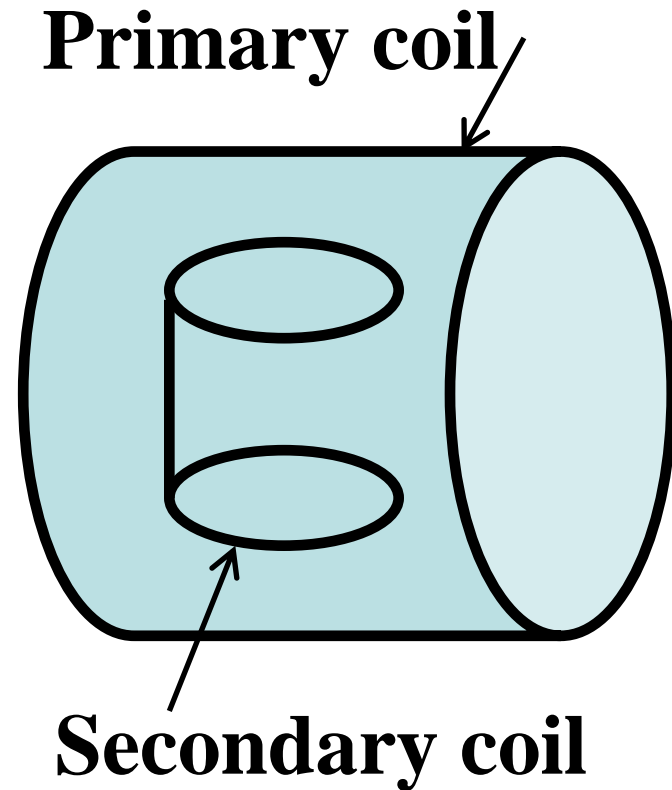


$$R_2 / R_1 = R_3 / R_x \quad (2.2)$$

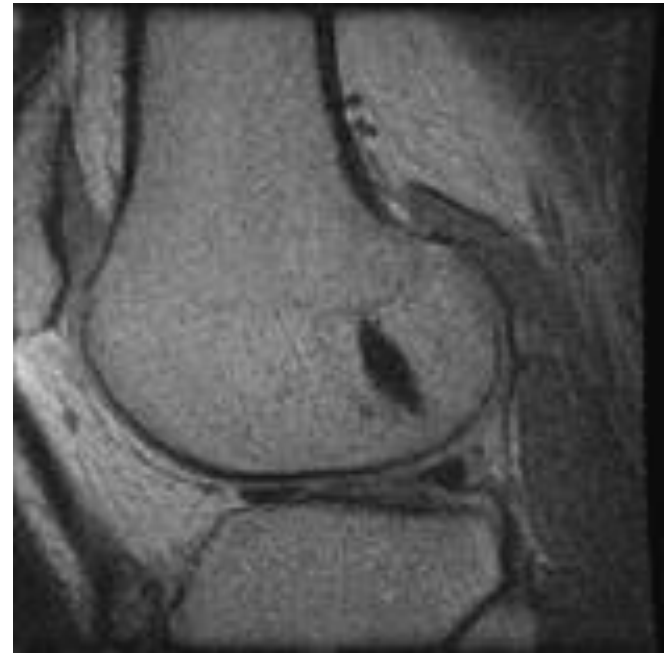


# Fig. 2.14: MRI (magnetic resonance image)

(a) Probe

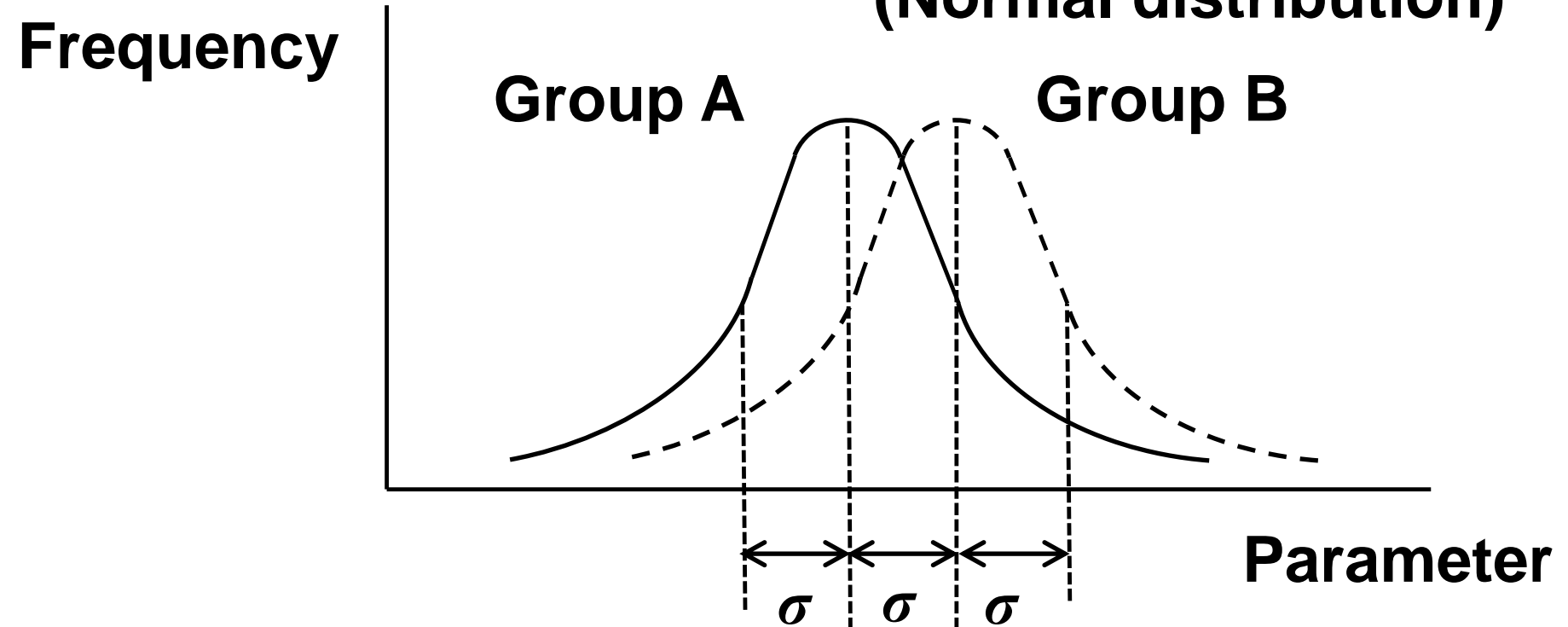


(b) MRI of Knee



# Fig. 2.15: Test of difference in the mean value

(Normal distribution)



$$\mu_A - \mu_B = \sigma, n = m$$

$n > 9, 5\%, n > 16, 1\%$

**Significance level**