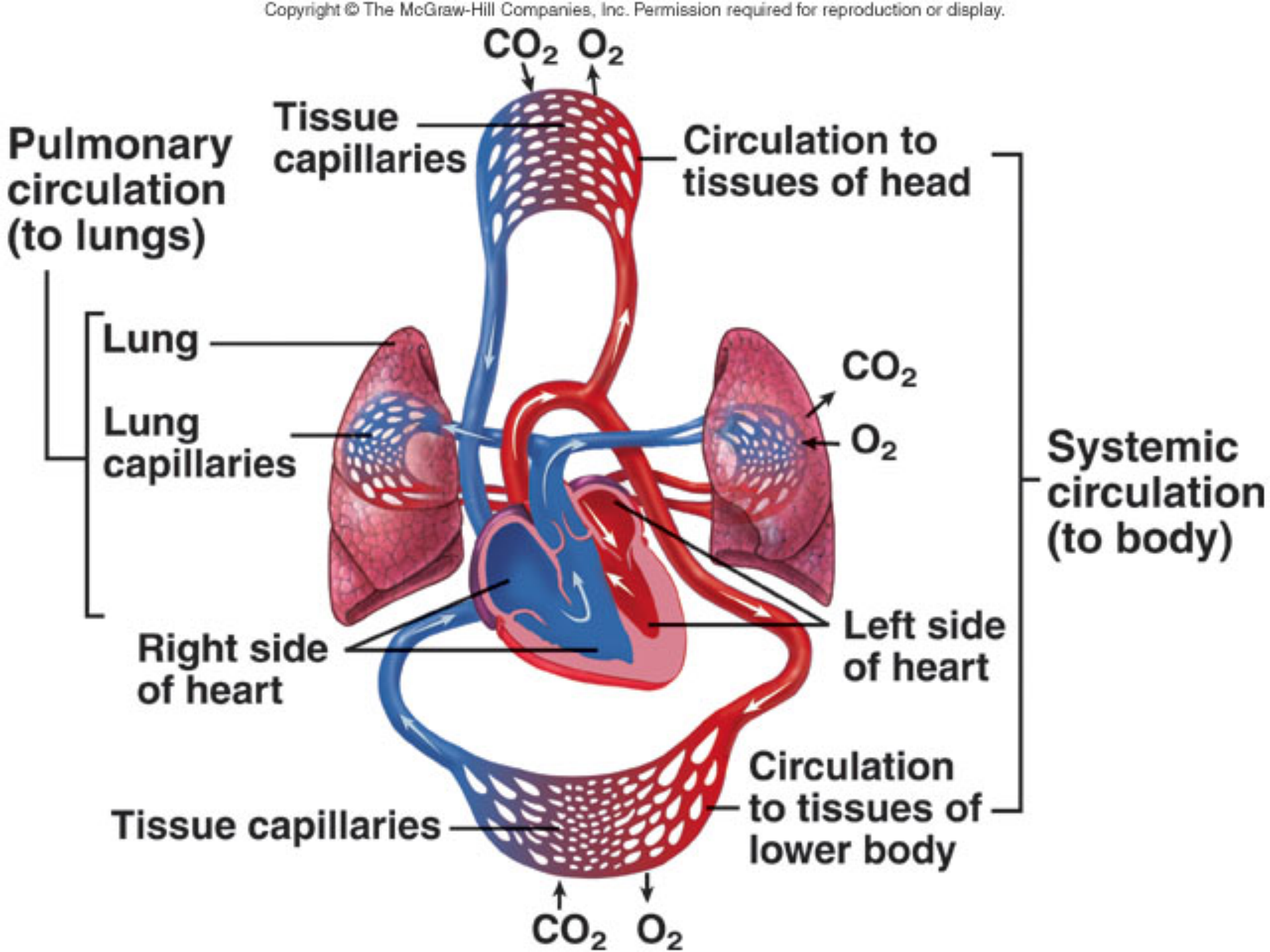
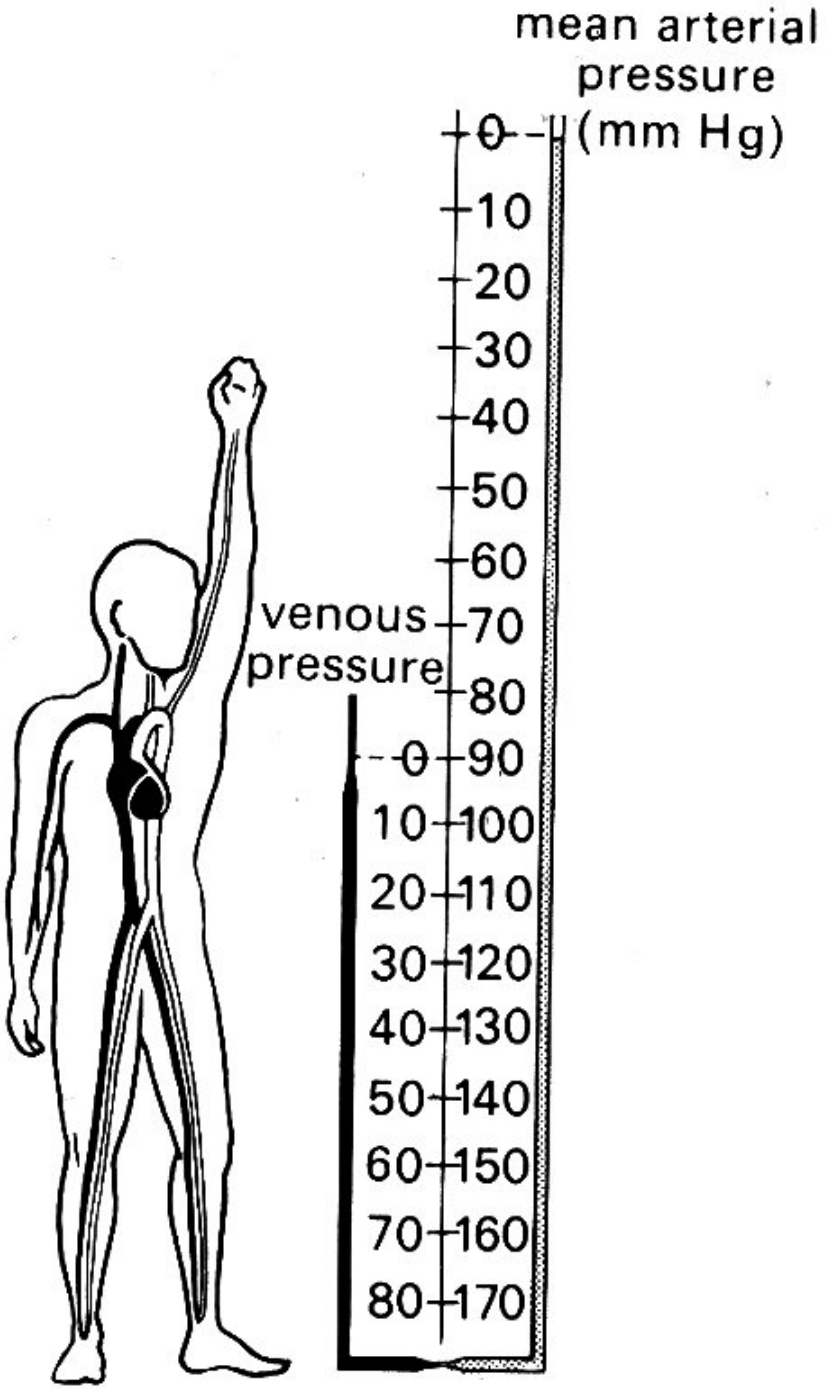
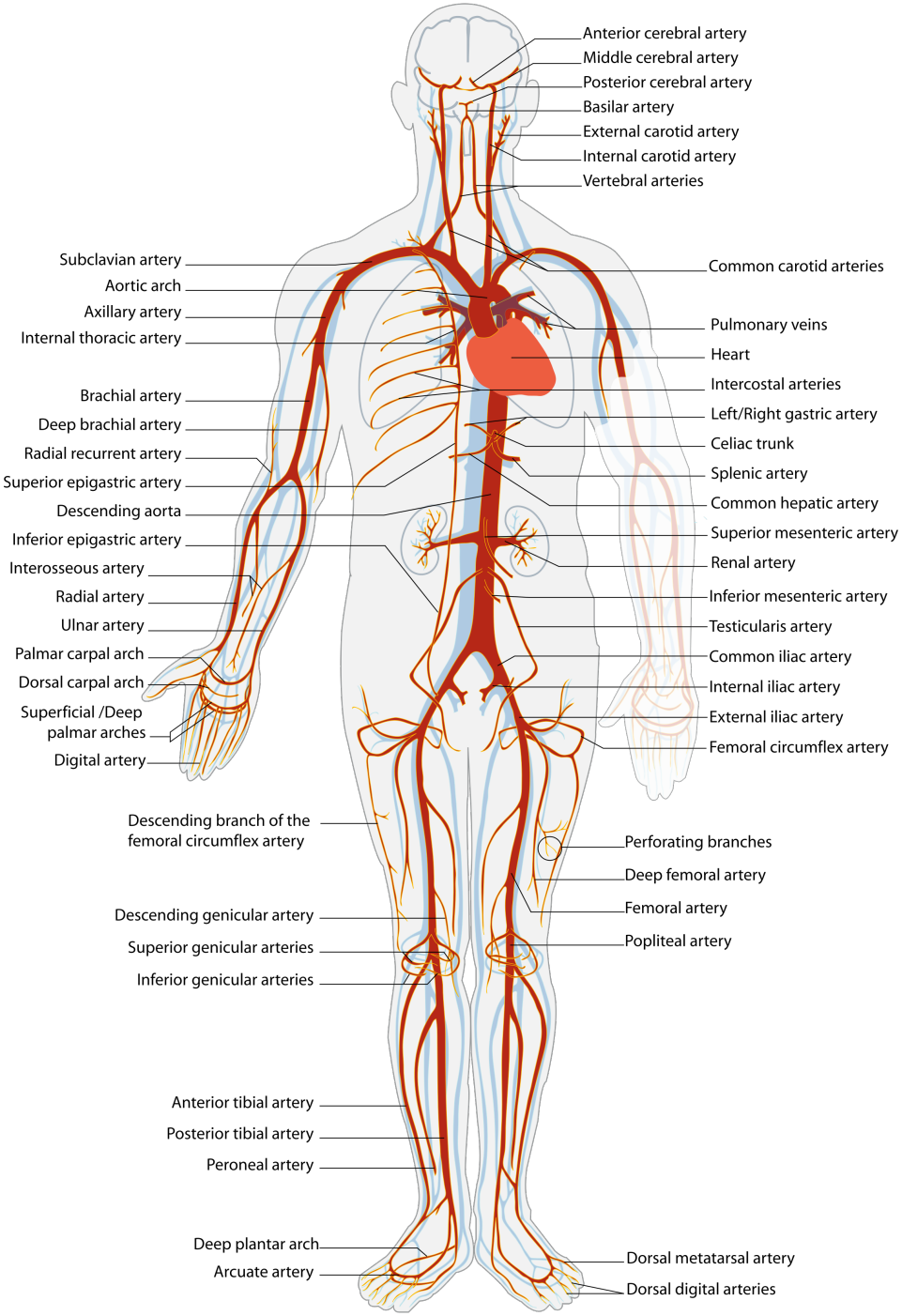
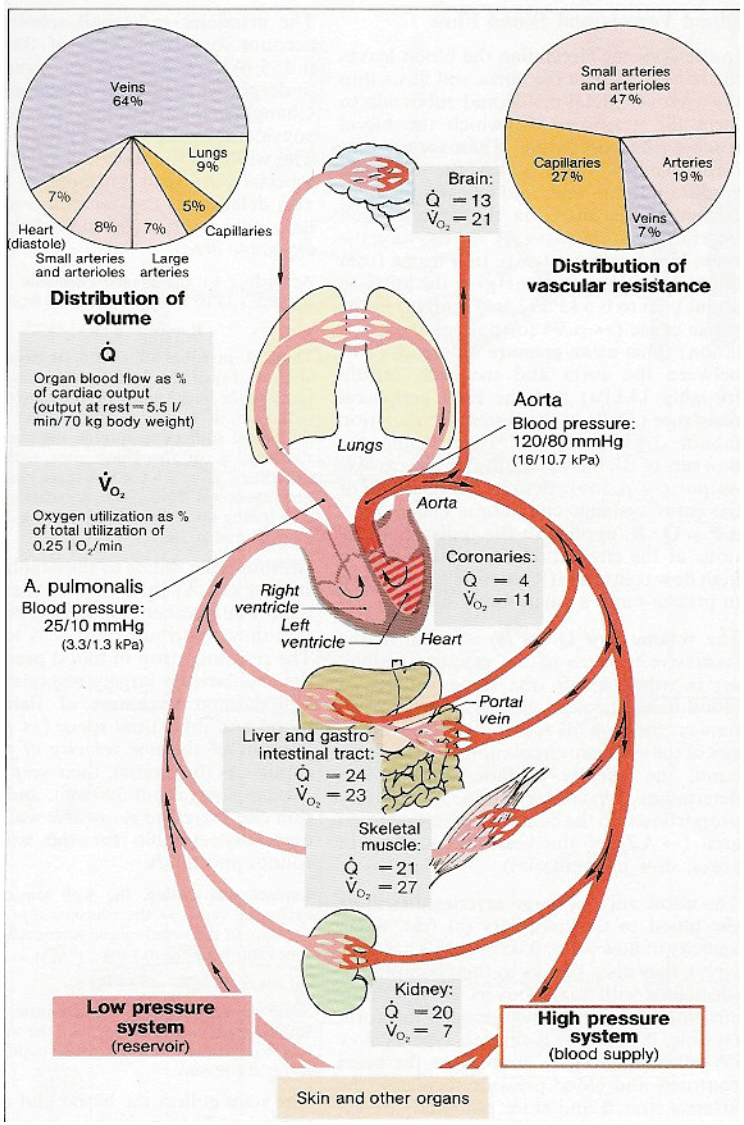



mean arterial pressure (mm Hg)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
venous pressure
0
10
20
30
40
50
60
70
80


Anterior cerebral artery
Middle cerebral artery
Posterior cerebral artery
Basilar artery
External carotid artery
Internal carotid artery
Vertebral arteries
Subclavian artery
Aortic arch
Axillary artery
Internal thoracic artery
Brachial artery
Deep brachial artery
Radial recurrent artery
Superior epigastric artery
Descending aorta
Inferior epigastric artery
Interosseous artery
Radial artery
Ulnar artery
Palmar carpal arch
Dorsal carpal arch
Superficial /Deep palmar arches
Digital artery
Common carotid arteries
Pulmonary veins
Heart
Intercostal arteries
Left/Right gastric artery
Celiac trunk
Splenic artery
Common hepatic artery
Superior mesenteric artery
Renal artery
Inferior mesenteric artery
Testicularis artery
Common iliac artery
Internal iliac artery
External iliac artery
Femoral circumflex artery
Descending branch of the femoral circumflex artery
Perforating branches
Deep femoral artery
Femoral artery
Popliteal artery
Descending genicular artery
Superior genicular arteries
Inferior genicular arteries
Anterior tibial artery
Posterior tibial artery
Peroneal artery
Deep plantar arch
Arcuate artery
Dorsal metatarsal artery
Dorsal digital arteries


Veins 64%
Lungs 9%
7%
5%
Heart (diastole) 8%
7%
Capillaries
Small arteries and arterioles
Large arteries
Distribution of volume
Small arteries and arterioles 47%
Capillaries 27%
Arteries 19%
Veins 7%
Distribution of vascular resistance
Brain: Q̇ = 13 V̇O2 = 21
Q̇
Organ blood flow as % of cardiac output (output at rest = 5.5 l/min/70 kg body weight)
V̇O2
Oxygen utilization as % of total utilization of 0.25 l O2/min
Lungs
Aorta
Blood pressure: 120/80 mmHg (16/10.7 kPa)
A. pulmonalis
Blood pressure: 25/10 mmHg (3.3/1.3 kPa)
Aorta
Coronaries: Q̇ = 4 V̇O2 = 11
Right ventricle
Left ventricle
Heart
Portal vein
Liver and gastro-intestinal tract: Q̇ = 24 V̇O2 = 23
Skeletal muscle: Q̇ = 21 V̇O2 = 27
Kidney: Q̇ = 20 V̇O2 = 7
Low pressure system (reservoir)
High pressure system (blood supply)
Skin and other organs

Key figures (typical values for young man):

Heart rate, HR = 70 beats/min

Stroke volume, SV = 80 ml

Cardiac output, CO = 70x 80 ml/min =5.6 lit/min

P_{mean} = 100 mmHg = 1.33 x 10^4 N/m^2

Total vascular resistance:

R = (P_{mean} - P_v) / Qmean

Typical value for total vascular resistance:

$$R = \frac{\bar{P} - P_v}{Q} = \frac{100\ mmHg - 5\ mmHg}{5.6\ \frac{lit}{min}\ \frac{1000\ ml}{lit} \cdot \frac{1\ min}{60\ s}}$$

$$= \frac{95\ mmHg}{93.3\ \frac{ml}{s}} = 1.02\ \frac{mmHg}{ml/s}$$

In general $R \simeq 1$ mmHg/ml/s