

# 3D Digital Human Information Modeling

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# Topics for 3D Digital Human Information Model

- A whole human body representation and information modeling
  - Integration of a whole human body model and health information
- Average person information modeling

# Website

<https://www.innerbody.com/>

## An existing information viewer for internal organs

« [Back](#)

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### Cecum

The cecum is the cul-de-sac at the beginning of the large intestine that descends from the union of the ileum and the large intestine. It provides a space for the mixing of bacteria with partially digested food from the small intestine to form feces.

### Anatomy

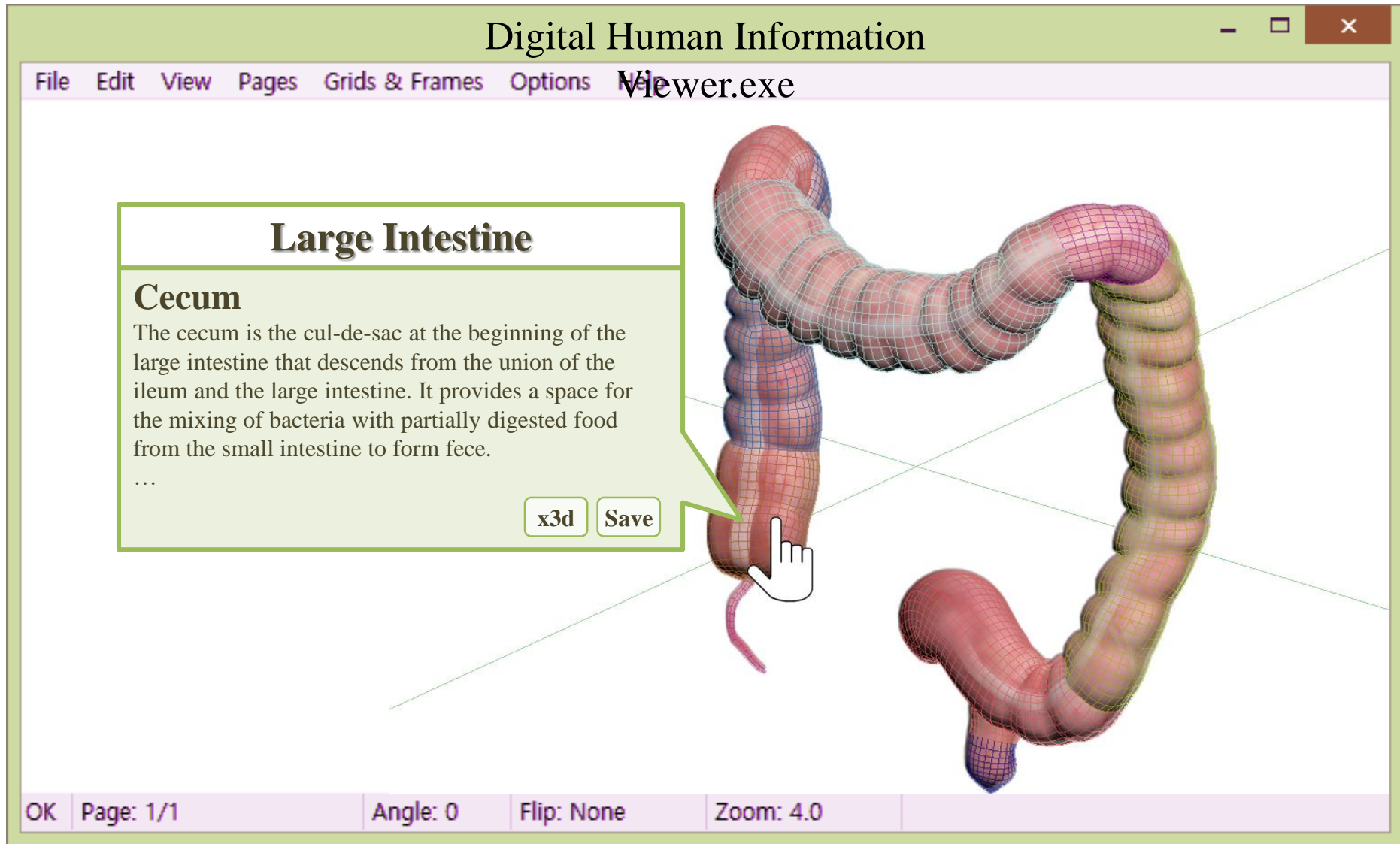
The cecum is a short, pouch-like region of the large intestine between the ascending colon and vermiform appendix. It is located in the lower right quadrant of the abdominal cavity inferior and lateral to the ileum.

### Physiology

The cecum plays an important role in the digestive system by assisting in the formation of feces. Partially digested food, known as chyme, passes through the small intestine where it is digested and most of its nutrients are absorbed. The ileocecal sphincter at the end of the small intestine opens and closes to allow small amounts of chyme to enter the cecum at the beginning of the large intestine. Chyme is next mixed with bacteria by contractions in the walls of...

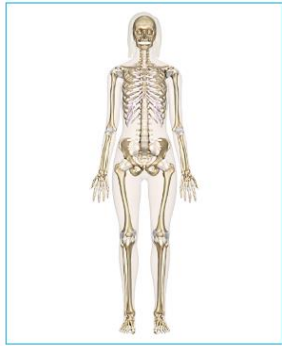
[Expand »](#)

The screenshot shows a web browser window with the URL <https://www.innerbody.com/anatomy/digestive/large-intestine>. The page features the InnerBody logo and a search bar. Below the search bar is a list of anatomical parts under the heading "Anatomy Explorer". The list includes: Small Intestine, Duodenum, Duodenojejunal Flexure, Jejunum, Ileum, Terminal Ileum, Ileocecal Valve, Large Intestine, Cecum (highlighted), Appendix, Ascending Colon, Hepatic Flexure, Transverse Colon, Splenic Flexure, Descending Colon, Sigmoid Colon, Rectum, and Anus. To the right of the list is a 3D anatomical illustration of the human digestive system. A hand cursor is pointing to the cecum in the illustration. The browser window also shows a search icon and a share icon in the top right corner.

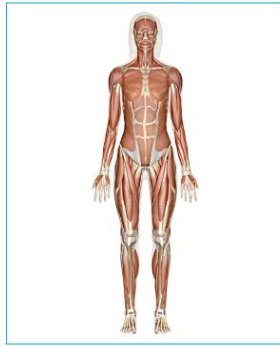


# Select a Human Anatomy System to Explore

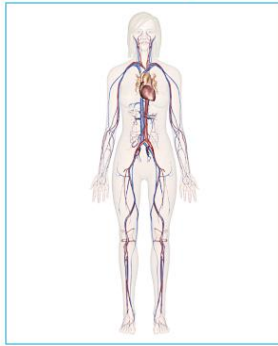
Skeletal System



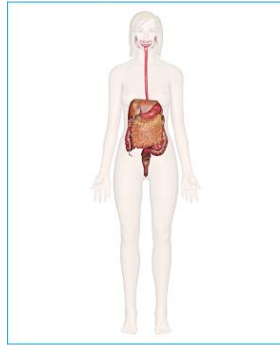
Muscular System



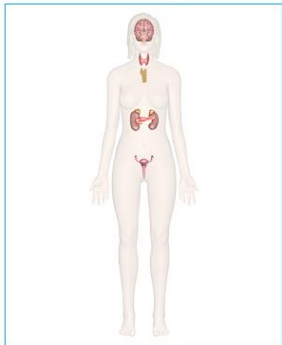
Cardiovascular System



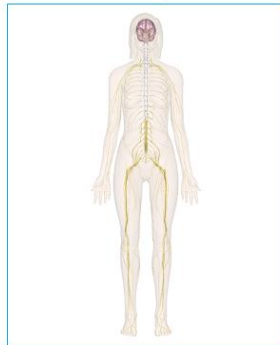
Digestive System



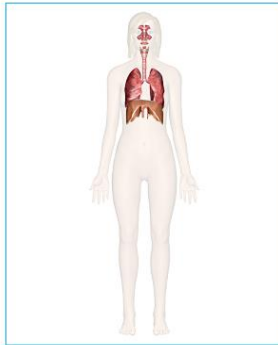
Endocrine System



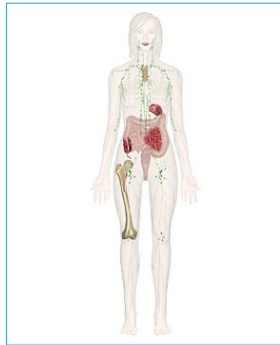
Nervous System



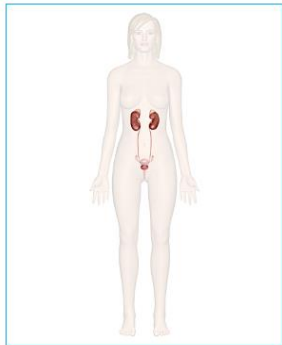
Respiratory System



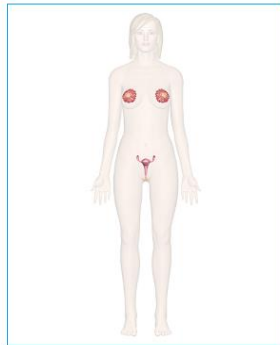
Immune / Lymphatic Systems



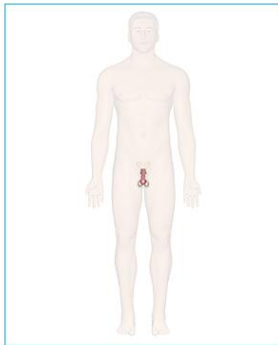
Urinary System



Female Reproductive System



Male Reproductive System



Integumentary System



1. Skeletal System
2. Muscular System
3. Cardiovascular System
4. Endocrine System
5. Nervous System

# Skeletal System

## Head And Neck

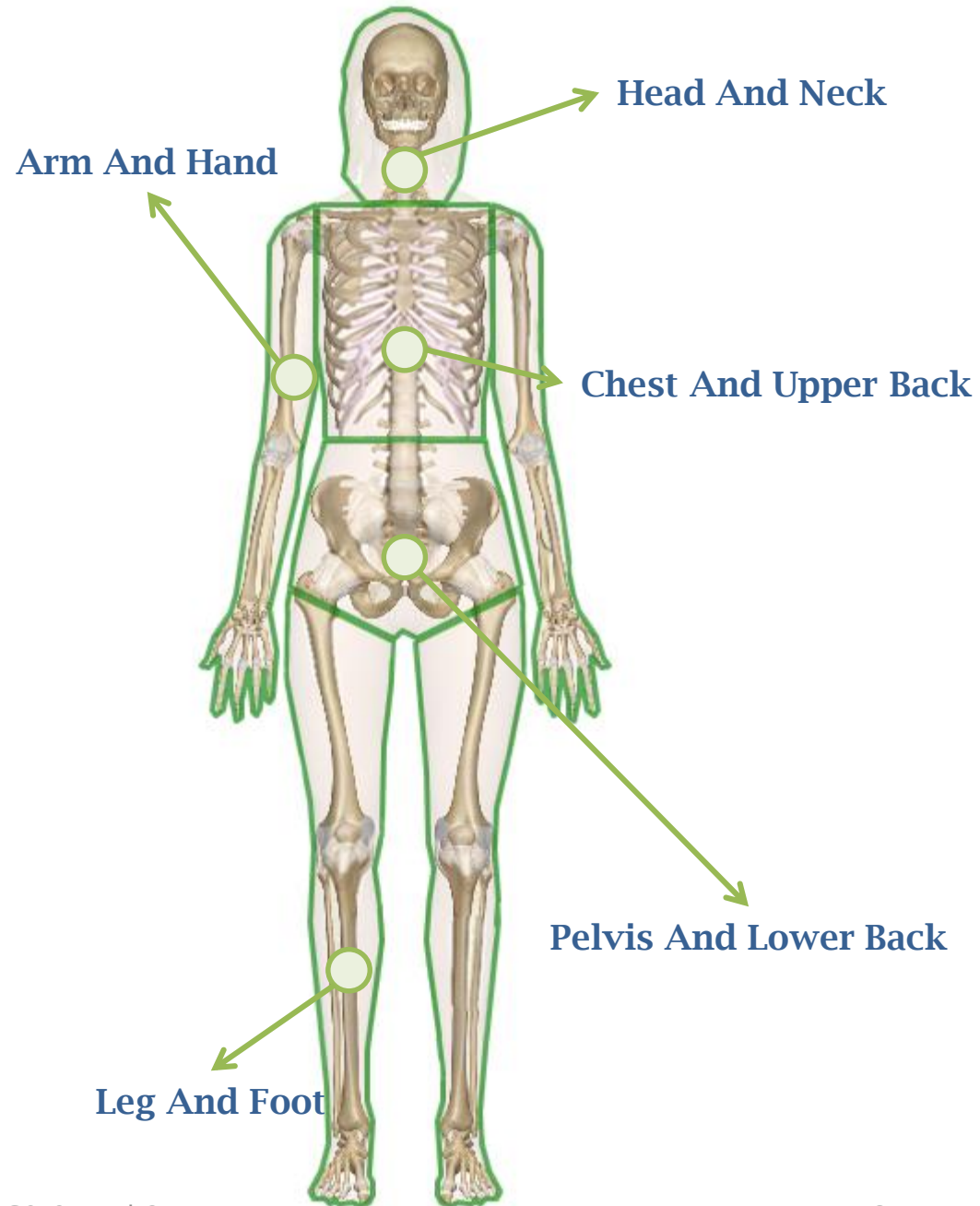
Skull  
Teeth

## Chest And Upper Back

Spine	Fales Ribs
Articular Capsule	Sternum
Costal Cartilage	True Ribs

## Pelvis And Lower Back

Sacrum	Obturator Membrane
Ilium	Pubic Symphysis
Ischium	Pubofemoral Ligament
Coccyx	



# Skeletal System

## Arm And Hand

Clavicle  
Scapula  
Humerus  
Radius  
Ulna  
Metacarpal Bones  
Capitate Bone  
Distal Phalanges of the Hand

## Leg And Foot

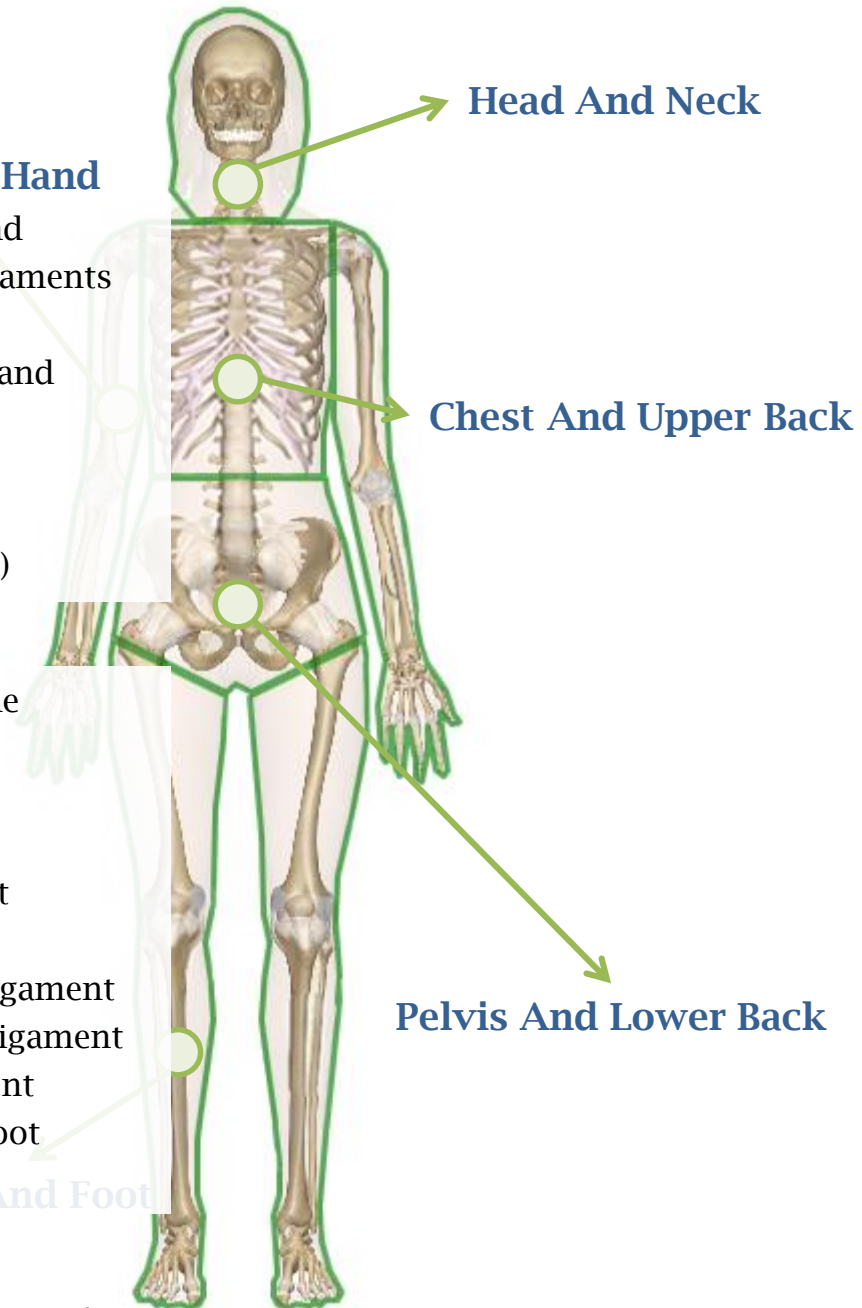
Femur  
Patella  
Tibia  
Fubula  
Metatarsal Bones  
Anterior Talofibular Ligament  
Calcaneus  
Cuboid Bone  
Deltoid Ligament  
Distal Phalanges of the Foot  
Dorsal Tarsometatarsal Ligaments

## Arm And Hand

Middle Phalanges of the Hand  
Palmar Carpometacarpal Ligaments  
Pisometacarpal Ligament  
Proximal Phalanges of the Hand  
Scaphoid Bone  
Trapezium Bone  
Trapezoid Bone  
Triquetral Bone (Triquetrum)

Intermediate Cuneiform Bone  
Lateral Cuneiform Bone  
Long Plantar Ligament  
Medial Cuneiform Bone  
Middle Phalanges of the Foot  
Navicular Bone  
Plantar Calcaneonavicular Ligament  
Plantar Cuboideonavicular Ligament  
Posterior Talofibular Ligament  
Proximal Phalanges of the Foot  
Talus

## Leg And Foot

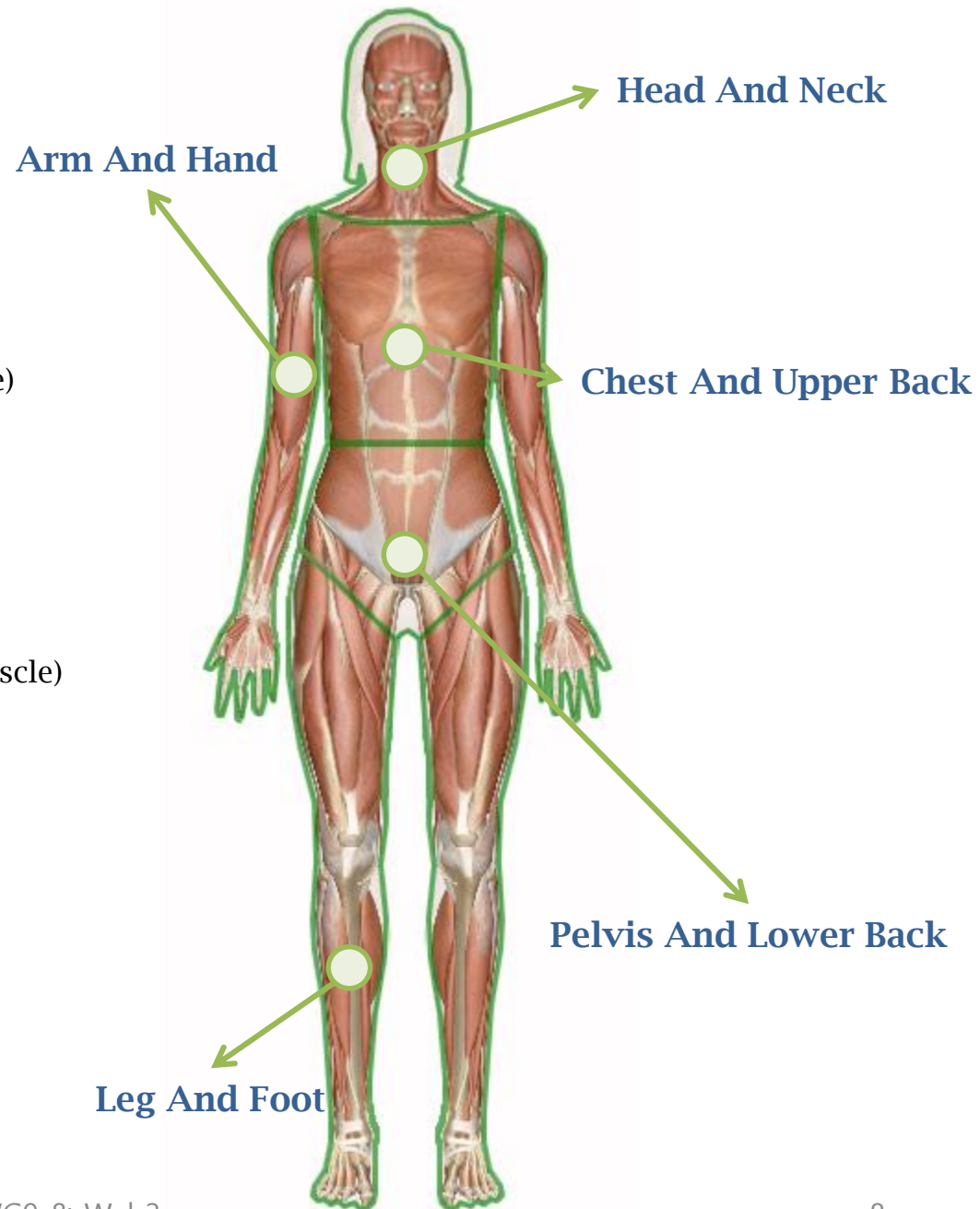




# Muscular System

## Head And Neck

Clavicular Head of Sternocleidomastoid Muscle  
Depressor Anguli Oris Muscle  
Depressor Labii Inferioris Muscle  
Frontal Belly of Epicranii Muscle (Frontalis Muscle)  
Galea Aponeurotica  
Levator Labii Superioris Alaeque Nasi Muscle  
Levator Labii Superioris Muscle  
Masseter Muscle  
Mentalis Muscle  
Nasalis Muscle  
Occipital Belly of Epicranii Muscle (Occipitalis Muscle)  
Omohyoid Muscle  
Orbicularis Oculi Muscle  
Orbicularis Oris Muscle  
Platysma Muscle  
Risorius Muscle  
Scalene Muscles  
Semispinalis Capitis Muscle  
Splenius Capitis Muscle  
Sternal Head of Sternocleidomastoid Muscle  
Temporalis Muscle  
Zygomaticus Major Muscle  
Zygomaticus Minor Muscle





# Muscular System

## Chest And Upper Back

Abdominal Head of Pectoralis Major Muscle  
Clavicular Head of Pectoralis Major Muscle  
Infraspinatus Muscle  
Latissimus Dorsi Muscle  
Levator Scapulae Muscle  
Serratus Anterior Muscle

## Abdomen And Lower Back

External Abdominal Oblique Muscle  
Internal Abdominal Oblique Muscle

## Arm And Hand

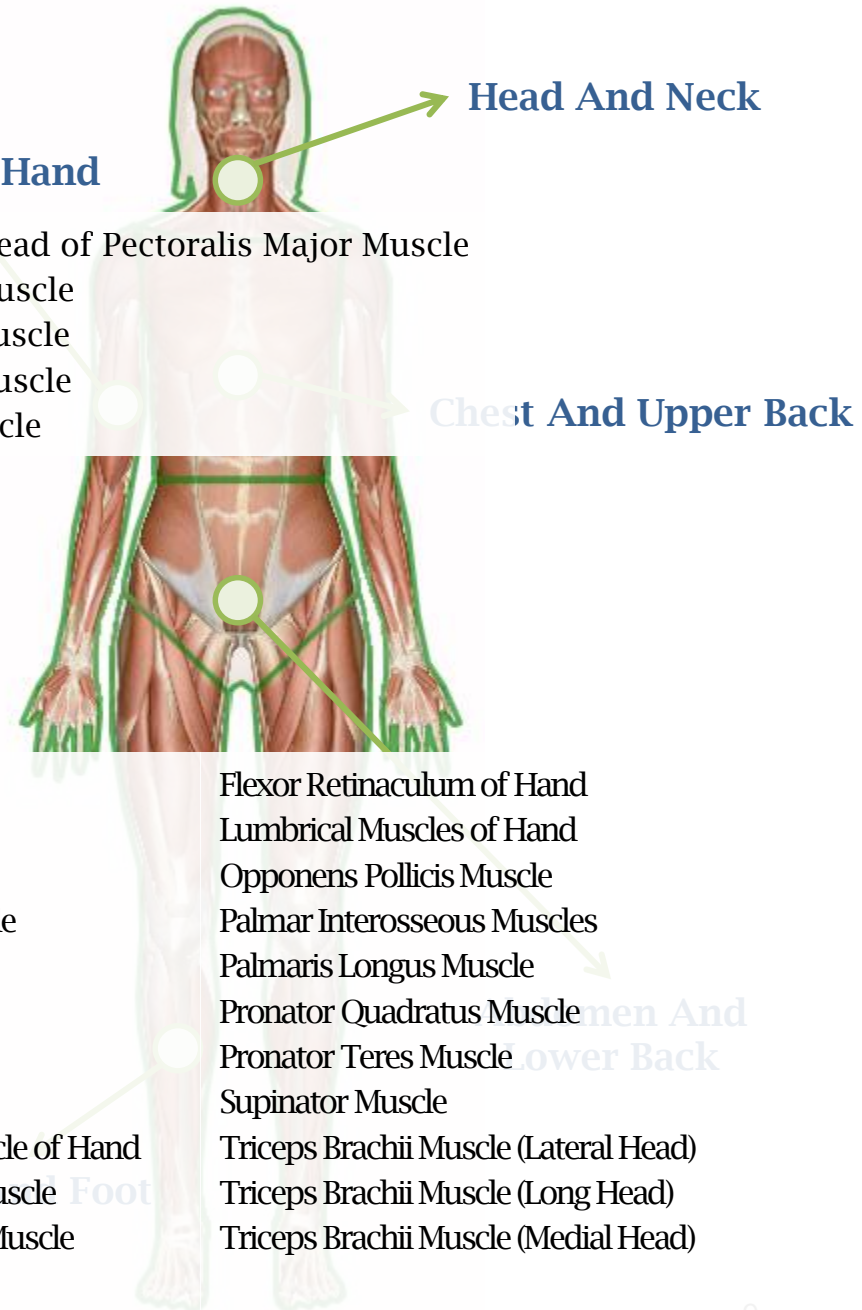
Abductor Hallucis Muscle  
Anconeus Muscle  
Biceps Brachii Muscle (Long Head)  
Biceps Brachii Muscle (Short Head)  
Brachialis Muscle  
Brachioradialis Muscle  
Coracobrachialis Muscle  
Deltoid Muscle  
Digital Fibrous Sheaths  
Extensor Carpi Radialis Brevis Muscle  
Extensor Carpi Radialis Brevis Tendon  
Extensor Carpi Radialis Longus Muscle

Extensor Carpi Ulnaris Muscle  
Extensor Digiti Minimi Muscle  
Extensor Hallucis Brevis Muscle  
Extensor Hallucis Longus Muscle  
Extensor Pollicis Brevis Muscle  
Extensor Retinaculum of Hand  
Flexor Carpi Radialis Muscle  
Flexor Carpi Ulnaris Muscle  
Flexor Digiti Minimi Brevis Muscle of Hand  
Flexor Digitorum Profundus Muscle  
Flexor Digitorum Superficialis Muscle  
Flexor Pollicis Brevis Muscle

## Arm And Hand

Sternocostal Head of Pectoralis Major Muscle  
Sternohyoid Muscle  
Teres Major Muscle  
Teres Minor Muscle  
Trapezius Muscle

Rectus Abdominis  
Thoracolumbar



# Muscular System

## Leg And Foot

Abductor Digiti Minimi Muscle of Foot  
Adductor Brevis Muscle  
Adductor Longus Muscle  
Adductor Magnus Muscle  
Biceps Femoris Muscle (Long Head)  
Calcaneal (Achilles) Tendon  
Dorsal Interosseous Muscles of Foot  
Extensor Digitorum Brevis Muscle  
Extensor Digitorum Longus Muscle  
Extensor Digitorum Muscle  
Flexor Digitorum Longus Muscle  
Flexor Hallucis Longus Muscle  
Flexor Retinaculum of Foot  
Gastrocnemius Muscle (Lateral Head)  
Gastrocnemius Muscle (Medial Head)  
Gluteus Maximus Muscle  
Gluteus Minimus Muscle  
Gracilis Muscle  
Iliacus Muscle  
Iliopsoas Muscle  
Iliotibial Tract

## Arm And Hand

Inferior Extensor Retinaculum  
Inguinal Ligament  
Lumbrical Muscles of Foot  
Pectineus Muscle  
Peroneus Brevis Muscle  
Peroneus Longus Muscle  
Peroneus Tertius Muscle  
Plantaris Tendon  
Quadriceps Femoris Tendon  
Rectus Femoris Muscle  
Sartorius Muscle  
Semimembranosus Muscle  
Semitendinosus Muscle  
Soleus Muscle  
Superior Extensor Retinaculum  
Tibialis Anterior Muscle  
Tibialis Posterior Muscle  
Vastus Lateralis Muscle  
Vastus Medialis Muscle

Head And Neck

Chest And Upper Back

Abdomen And Lower Back

Leg And Foot

# Cardiovascular System

## Head And Neck

External Carotid Artery  
Facial Artery  
Facial Vein  
Internal Carotid Artery  
Left External Jugular Vein

Left Internal Jugular Vein  
Retromandibular Vein  
Right External Jugular Vein  
Right Internal Jugular Vein  
Vertebral Artery

## Heart And Chest

Heart  
Aorta  
Brachiocephalic Trunk  
Inferior Vena Cava  
Left Common Carotid Artery  
Left Inferior Pulmonary Vein  
Left Subclavian Artery  
Left Subclavian Vein

Left Superior Pulmonary Vein  
Pulmonary Trunk  
Right Common Carotid Artery  
Right Inferior Pulmonary Vein  
Right Subclavian Artery  
Right Subclavian Vein  
Right Superior Pulmonary Vein  
Superior Vena Cava

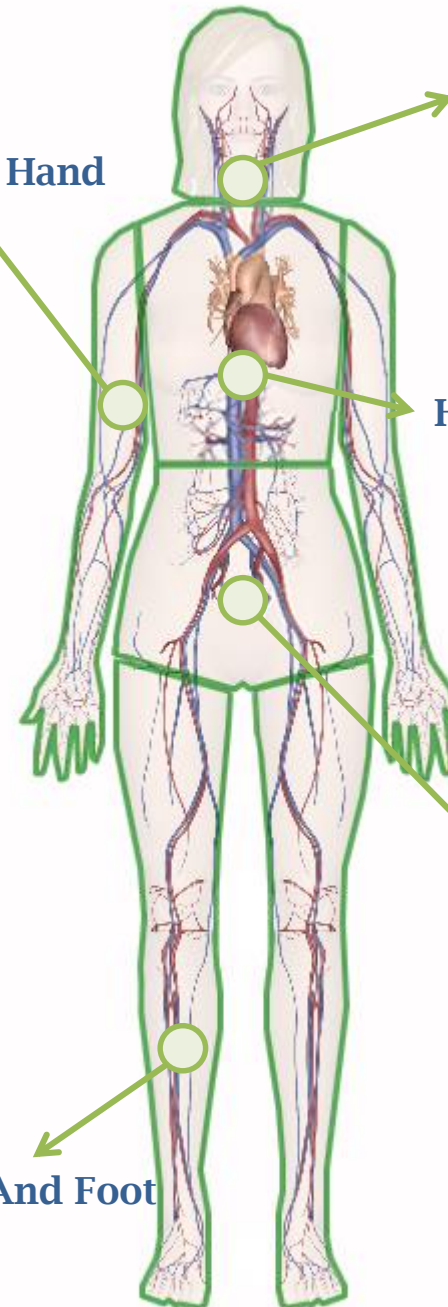
Arm And Hand

Head And Neck

Heart And Chest

Lower Torso

Leg And Foot



# Cardiovascular System

## LOWER TORSO

Arcuate Artery	External Iliac Artery
Blood Filtration in the Kidney	External Iliac Vein
Celiac Artery (Celiac Trunk)	Hepatic Portal Vein
Common Hepatic Artery	Hepatic Veins
Common Iliac Artery	Inferior Mesenteric Artery
Common Iliac Vein	Inferior Mesenteric Vein

## ARM AND HAND

Accessory Cephalic Vein	Brachial Vein
Axillary Artery	Cephalic Vein
Axillary Vein	Deep Palmar Arterial Arch
Basilic Vein	Dorsal Digital Veins of Hand
Brachial Artery	Dorsal Metacarpal Veins

## LEG AND FOOT

Anterior Tibial Artery	Dorsal Venous Arch of Foot
Anterior Tibial Vein	Femoral Artery
Deep Femoral Artery (Profunda Femoris)	Femoral Vein
Deep Femoral Vein (Profunda Femoris)	Fibular (Peroneal) Artery
Dorsal Digital Arteries of Foot	Great Saphenous Vein
Dorsal Digital Veins of Foot	Lateral Circumflex Femoral Artery
Dorsal Metatarsal Arteries	Lateral Circumflex Femoral Vein
Dorsal Metatarsal Veins	Lateral Inferior Genicular Artery

## Arm And Hand

Internal Iliac Artery
Internal Iliac Vein
Intestinal Arteries
Intestinal Veins
Left Renal Artery
Left Renal Vein

Dorsal Venous Network of Hand
Inferior Ulnar Collateral Artery
Intermediate Antebrachial Vein
Palmar Digital Arteries

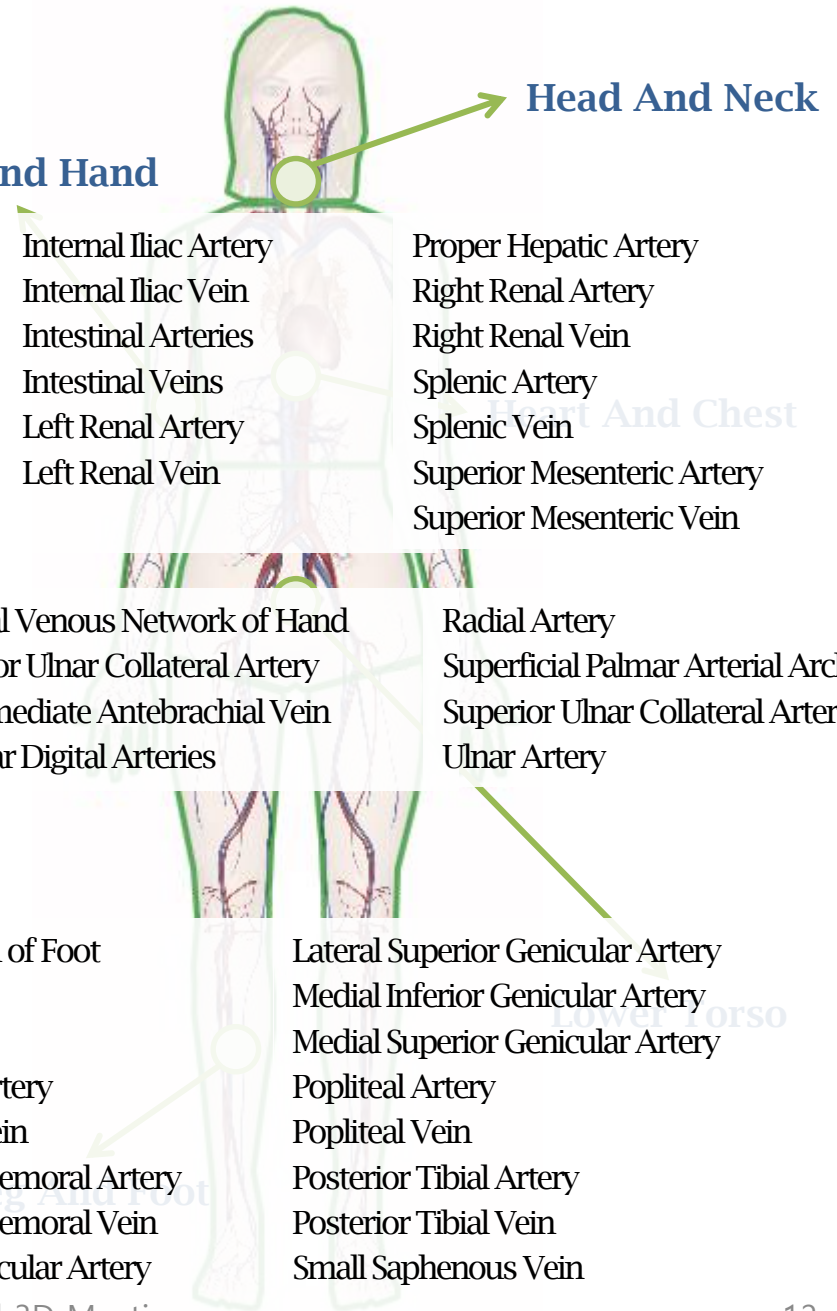
Dorsal Venous Arch of Foot
Femoral Artery
Femoral Vein
Fibular (Peroneal) Artery
Great Saphenous Vein
Lateral Circumflex Femoral Artery
Lateral Circumflex Femoral Vein
Lateral Inferior Genicular Artery

## Head And Neck

Proper Hepatic Artery
Right Renal Artery
Right Renal Vein
Splenic Artery
Splenic Vein
Superior Mesenteric Artery
Superior Mesenteric Vein

Radial Artery
Superficial Palmar Arterial Arch
Superior Ulnar Collateral Artery
Ulnar Artery

Lateral Superior Genicular Artery
Medial Inferior Genicular Artery
Medial Superior Genicular Artery
Popliteal Artery
Popliteal Vein
Posterior Tibial Artery
Posterior Tibial Vein
Small Saphenous Vein



# Endocrine System

## Head And Neck

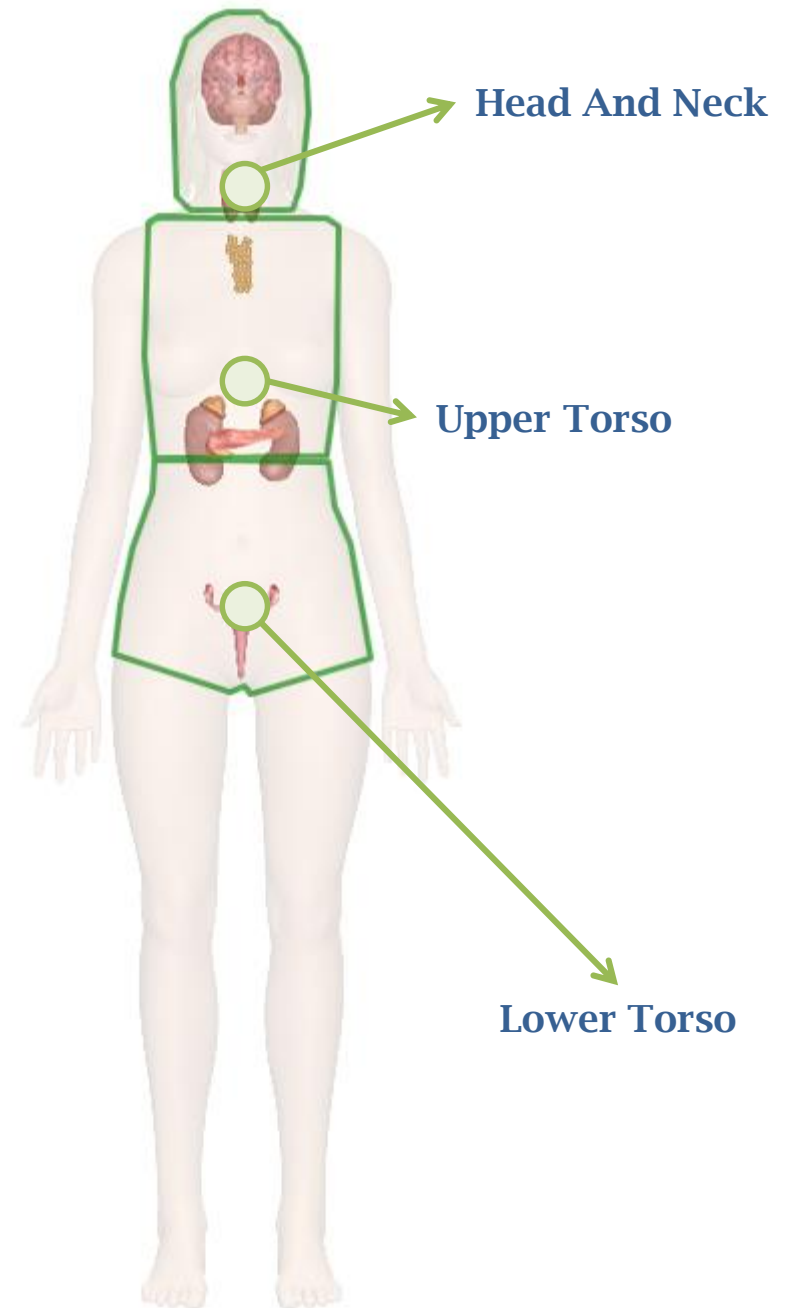
- Hypothalamus
- Parathyroid Glands
- Pineal Gland
- Pituitary Gland
- Thyroid Gland

## Upper Torso

- Thymus Gland

## LOWER TORSO

- Ovaries
- Pancreas
- Suprarenal (Adrenal) Glands
- Testes
- Uterus





# Nervous System

## Head And Neck

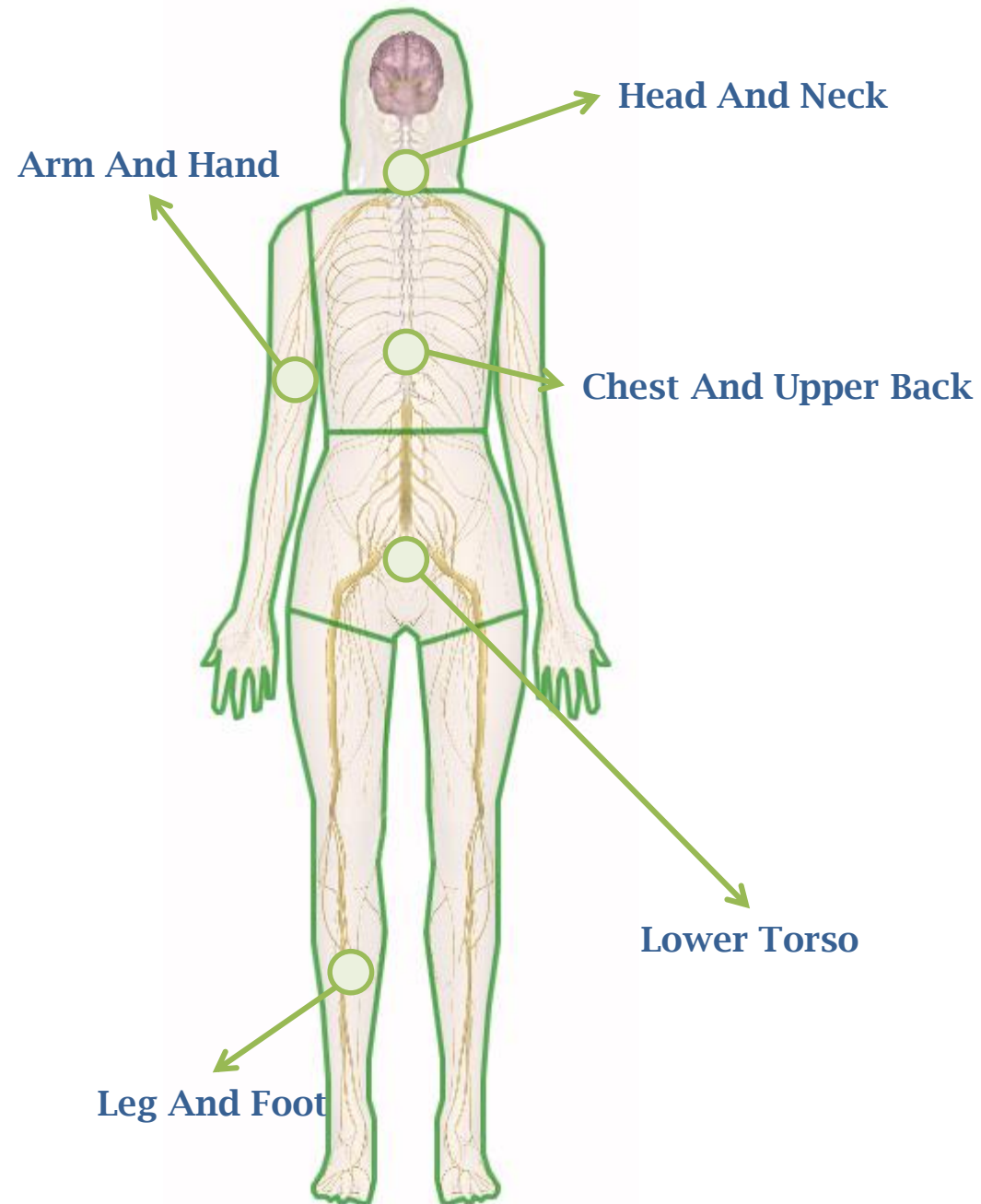
Brain  
Ears and Hearing  
Eyes and Vision  
Cranial Nerve X - Vagus  
Nerve  
1<sup>st</sup> Cervical Nerve  
Facial Nerve  
Taste Buds

## CHEST AND UPPER BACK

1st Thoracic Nerve  
Spinal Cord

## LOWER TORSO

1st Lumbar Nerve  
1st Sacral Nerve  
Pudental Nerve





# Nervous System

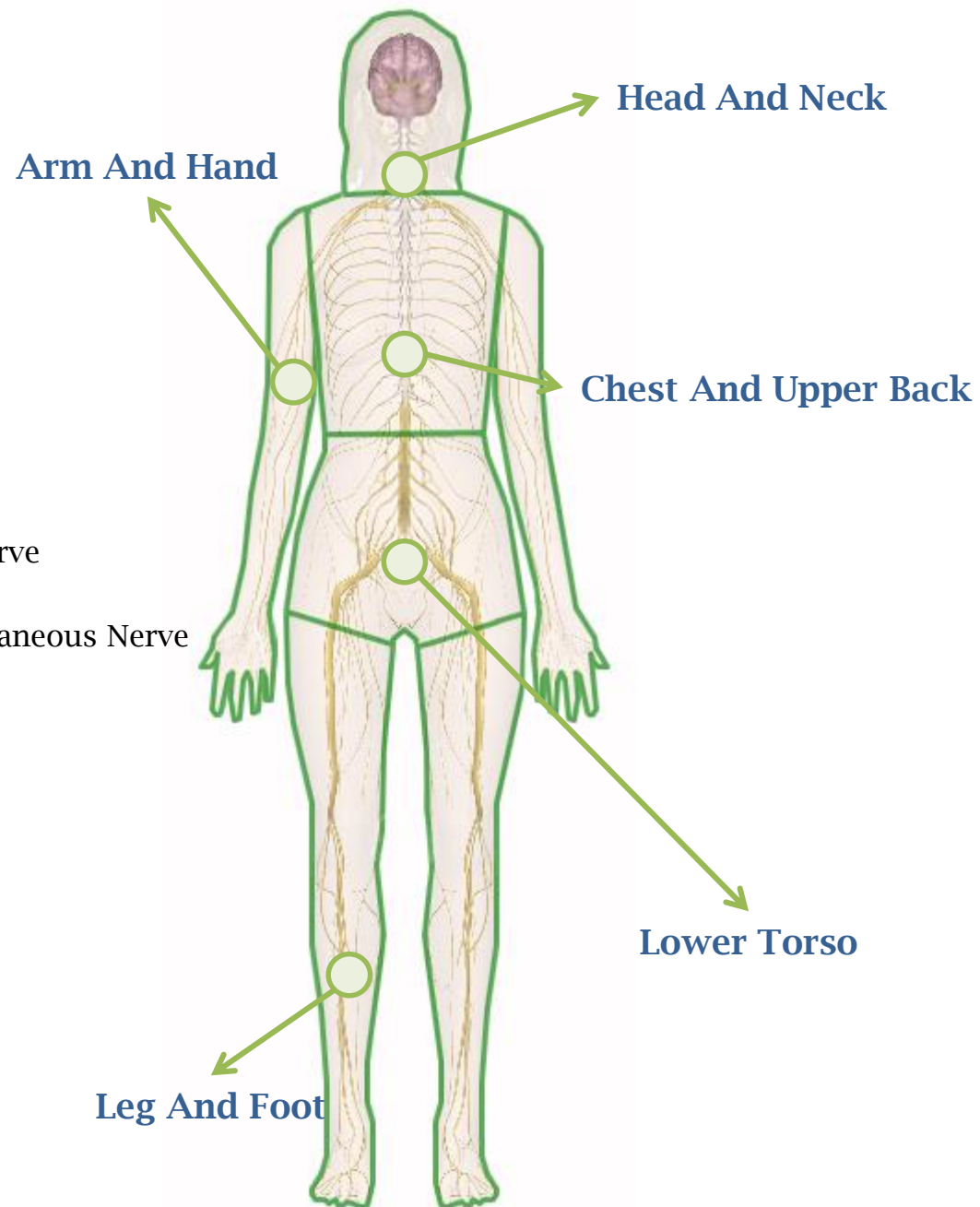
## ARM AND HAND

Median Nerve  
Musculocutaneous Nerve  
Palmar Digital Nerves  
Radial Nerve  
Ulnar Nerve

## LEG AND FOOT

Common Peroneal Nerve  
Common Plantar Digital Nerves  
Femoral Nerve  
Lateral Plantar Nerve  
Medial Plantar Nerve  
Peroneal Communicating Branch of

Musculocutaneous Nerve  
Plantar Digital Nerves  
Posterior Femoral Cutaneous Nerve  
Saphenous Nerve  
Sciatic Nerve  
Sural Nerve  
Tibial Nerve



# 3D Digital Human Information Model

- A whole human body representation and information modeling
  - A human anatomy system with health information for a person
  - 3D Visual interactive health information
  - Position, orientation, and size of each internal organ
  - Anatomy and health information with 3D annotation
- Average person information modeling

# H-Anim Standards and New Work Items

- ISO/IEC 19774-1 FDIS Humanoid Animation (H-Anim) V2.0: Architecture
- ISO/IEC 19774-2 FDIS Humanoid Animation (H-Anim) V1.0 : Motion data animation
- ISO/IEC 19774-3 H-Anim Facial Animation: to be submitted
- Human Internal Organ Representation Models: being prepared
- Human Respiratory System Representation: being prepared
- Human Digestive System Representation: being prepared
- Human Circulatory System Representation: being prepared

# ISO/IEC 19774 FDIS Humanoid Animation (H-Anim) - Part 1: Architecture

ISO/IEC FDIS 19774-1:2019

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ISO/IEC FDIS 19774

## Humanoid animation (H-Anim) Part 1: Architecture



This document is Final Draft International Standard (FDIS) of ISO/IEC 19774-1:2019, Humanoid animation (H-Anim). The full title of this International Standard is: *Information technology — Computer graphics, image processing and environmental data representation — Humanoid animation (H-Anim) — Part 1: Architecture.*

Background	Clauses	Annexes
 <a href="#">Foreword</a>	 <a href="#">1 Scope</a>	 <a href="#">A (informative) Nominal human body dimensions and levels of articulation (LOAs)</a>
 <a href="#">Overview</a>	 <a href="#">2 Normative references</a>	 <a href="#">B (informative) Feature points for the human body</a>
	 <a href="#">3 Terms and definitions</a>	 <a href="#">C (informative) VRML binding</a>
	 <a href="#">4 Concepts</a>	 <a href="#">D (informative) X3D binding</a>
	 <a href="#">5 Abstract data types</a>	 <a href="#">E (informative) Guidelines for H-Anim in VRML and X3D worlds</a>
	 <a href="#">6 Object interfaces</a>	 <a href="#">F (informative) Guidelines for H-Anim character design</a>

# ISO/IEC FDIS 19774 Humanoid Animation (H-Anim) – Part 2: Motion data animation
















ISO/IEC FDIS 19774

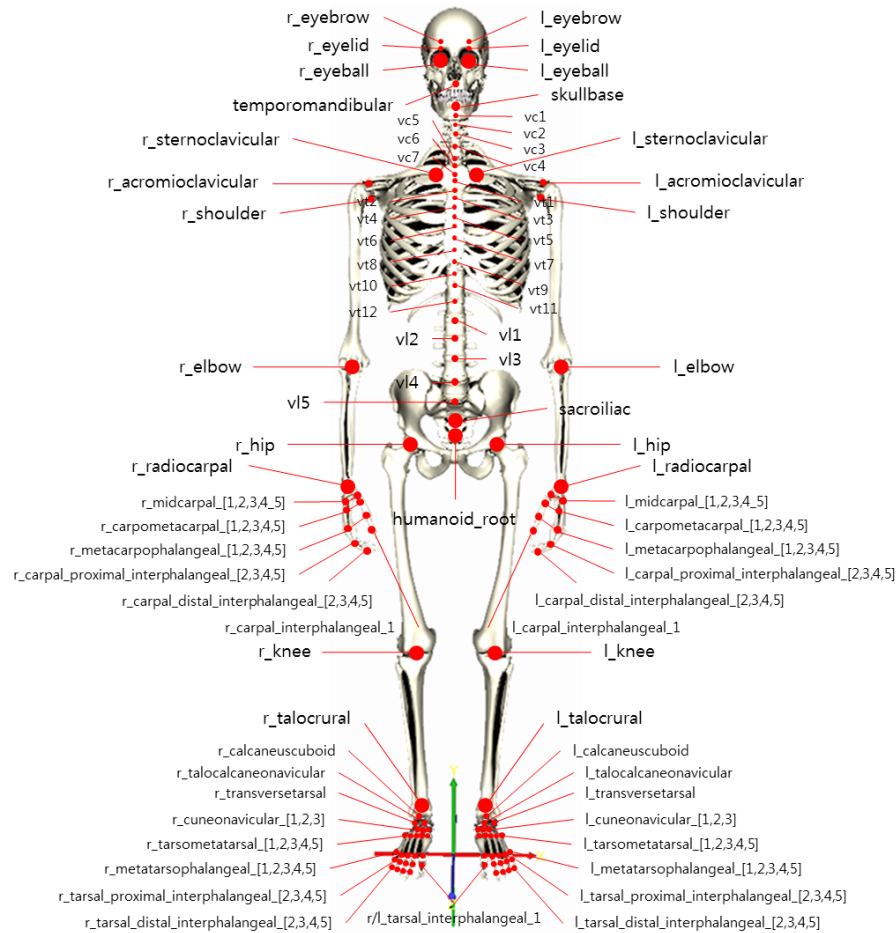
## Humanoid animation (H-Anim) – Part 2: Motion data animation



This document is Final Draft International Standard (FDIS) of ISO/IEC 19774-2:2019, Humanoid animation (H-Anim) – Part 2: Motion data animation. The full title of this International Standard is: *Information technology – Computer graphics, image processing and environmental data representation – Humanoid animation (H-Anim) – Part 2: Motion data animation.*

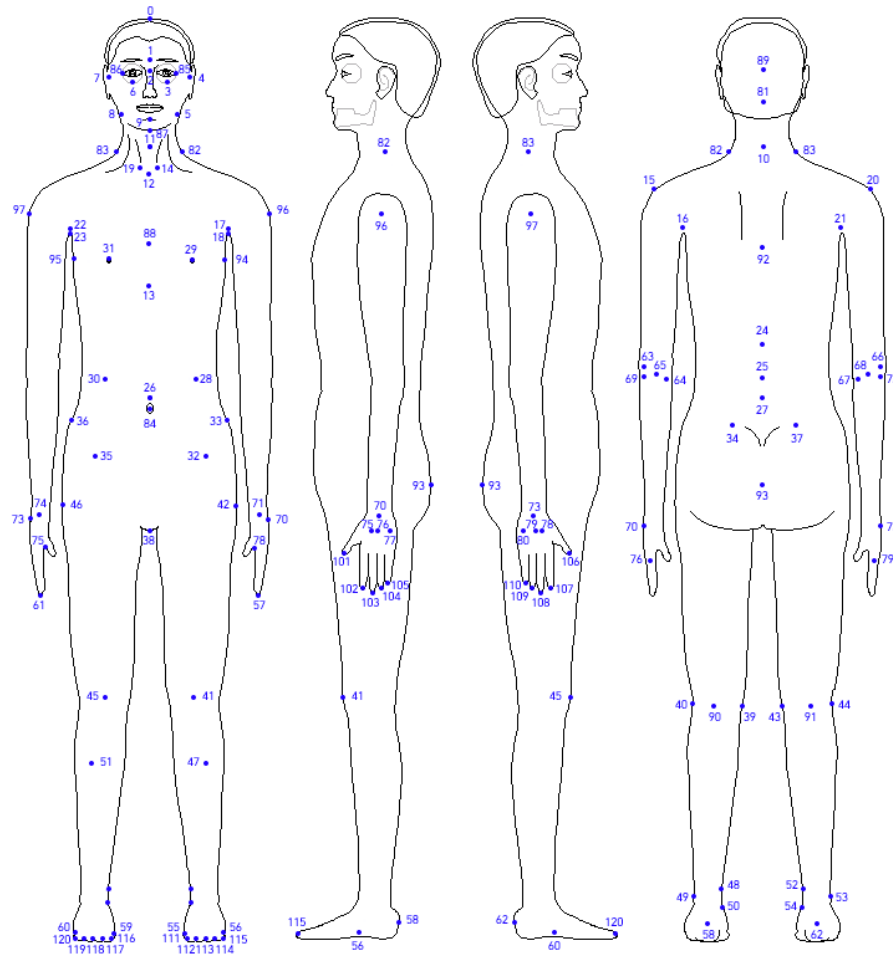
Background	Clauses	Annexes
 <a href="#">Foreword</a>	 1 <a href="#">Scope</a>	 <a href="#">A (informative) Motion capture file examples</a>
 <a href="#">Introduction</a>	 2 <a href="#">Normative references</a>	 <a href="#">B (informative) An example of H-Anim keyframe animation using interpolators</a>
	 3 <a href="#">Terms, definitions, acronyms, and abbreviations</a>	 <a href="#">C (informative) An example of H-Anim motion data animation using interpolators</a>
	 4 <a href="#">Concepts</a>	 <a href="#">D (informative) Examples of H-Anim motion data animation using a Motion object</a>
	 5 <a href="#">H-Anim motion data animation using interpolators</a>	 <a href="#">Bibliography</a>
	 6 <a href="#">H-Anim motion data animation using Motion</a>	

# H-Anim LOA 4 (Level of Articulation)





# H-Anim Feature Points



# Definitions related to person

- Average person
- Normal person
- Standard person
- Reasonable person

# Difference between “normal person” and “average person”

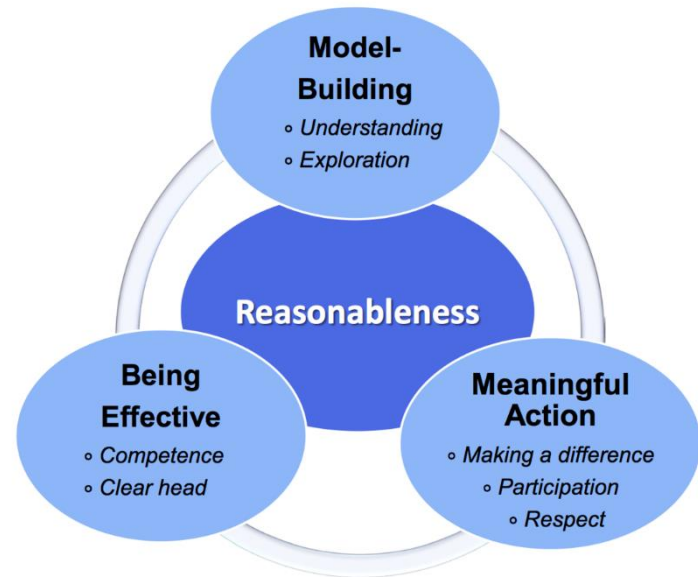
- In general, *normal* is subjective, while *average* is more objective (even quantifiable)
- *Normal* has societal connotations and can vary according to perception, experience, culture, politics, and period of history, whilst *average* usually refers to the results of statistical measurements related to groups of people

# Standard person

- The *standard* person or *reference* person is a theoretical individual that has perfectly "normal" characteristics. This model is typically used for research into radiation safety. For many years, the *standard* person was called *reference* man because the work assumed a healthy, young adult male. In recent years, reference woman and reference child models have been created, along with variations on body size, age, sex, and race.

# Reasonable person

- A psychological framework that posits human functioning is improved when the following three domains of informational needs are met:



# Average Korean Model

- A virtual human model that has information of Korean body data
- For example, height, weight, blood pressure, etc.



# 1. Average Korean Height

Year Age	Male Average Height (cm)							Female Average Height (cm)						
	1979	1986	1992	1997	2004	2010	2015	1979	1986	1992	1997	2004	2010	2015
16	165.5	166.2	168.5	170.1	170.3	170.8	172.1	155.2	155.9	156.9	159.7	159.6	159.7	159.8
17	167.6	167.0	170.5	170.7	172.5	173.1	172.5	155.5	155.8	157.8	159.3	159.7	160.5	159.7
18	166.8	167.9	169.9	171.6	172.9	173.2	172.9	155.7	156.2	159.6	160.0	160.3	160.5	159.4
19	166.8	168.3	170.4	171.6	173.4	172.8	173.1	155.7	156.4	159.4	159.1	160.2	159.8	159.7
20-24	167.7	167.7	169.6	171.3	173.8	173.5	174.2	155.5	155.4	158.8	160.2	160.7	160.4	160.9
25-29	167.0	166.6	169.3	171.7	172.5	173.6	173.6	155.2	155.2	158.3	159.3	159.3	160.2	160.8
30-34	166.1	167.7	168.9	171.3	171.3	172.4	173.7	153.7	154.5	156.5	158.3	158.1	160.1	160.2
35-39	166.0	166.8	168.2	169.6	170.7	171.9	171.9	154.2	154.9	156.2	157.3	157.2	159	160.2
40-49	163.9	165.8	167.1	167.9	168.6	169.2	170.3	153.1	154.7	155.2	156.7	156.1	156.7	157.0
50-59	-	166.2	165.4	166.5	166.1	166.3	168.1	-	150.0	153.8	153.4	154.3	154.7	154.6
60-69	-	-	-	164.1	164.4	166.4	165.3	-	-	-	151.2	151.8	152.3	152.8

## 2. Average Korean Weight

Year Age	Male Average Weight (kg)							Female Average Weight (kg)						
	1979	1986	1992	1997	2004	2010	2015	1979	1986	1992	1997	2004	2010	2015
16	54.3	56.2	59.3	59.6	63.4	62.6	63.9	51.0	50.0	52.5	52.3	53.7	53.8	53.8
17	56.7	57.1	61.1	60.4	65.2	66.8	65.2	51.4	50.8	52.6	53.0	54.2	54.4	54.9
18	58.8	59.1	61.2	62.4	67.4	67.2	66.5	53.0	51.8	53.3	52.8	55.3	54.4	56.4
19	58.8	59.7	63.0	64.1	68.3	66.7	68.1	53.0	51.8	53.5	52.2	53.3	53.8	56.1
20-24	61.3	60.8	63.6	65.6	69.5	69.2	71.1	52.7	51.2	52.5	51.7	53.5	53.1	55.1
25-29	60.7	61.7	65.1	68.0	70.1	72.3	73.9	51.0	51.6	53.5	52.2	54.8	53.4	55.7
30-34	60.8	64.5	66.5	68.0	71.5	73.0	76.3	51.9	53.0	54.5	54.8	55.2	55.8	56.7
35-39	62.2	65.1	67.4	68.4	72.3	74.1	75.0	52.4	54.5	56.0	54.9	57.1	56.0	58.7
40-49	59.2	65.2	69.0	68.8	70.6	71.2	73.3	53.7	58.2	58.3	57.1	57.4	57.2	58.2
50-59	-	61.5	63.5	67.5	69.1	68.6	70.6	-	53.8	59.3	57.2	60.2	59.0	58.7
60-69	-	-	-	60.4	65.9	66.5	68.5	-	-	-	55.7	58.4	57.8	58.7

### 3. Average Korean BMI

Year Age	Male Average BMI (kg/m <sup>2</sup> )							Female Average BMI (kg/m <sup>2</sup> )						
	1979	1986	1992	1997	2004	2010	2015	1979	1986	1992	1997	2004	2010	2015
16	19.8	20.3	20.9	20.6	21.9	21.4	21.5	21.2	20.6	21.3	20.5	21.1	21.1	21.0
17	20.2	20.5	21.0	20.7	21.9	22.3	21.8	21.3	20.9	21.1	20.9	21.3	21.1	21.5
18	21.1	21.0	21.2	21.2	22.5	22.4	22.2	21.9	21.2	20.9	20.6	21.5	21.1	22.2
19	21.1	21.1	21.7	21.8	22.7	22.3	22.6	21.9	21.2	21.1	20.6	20.8	21.0	21.9
20-24	21.8	21.5	22.1	22.1	23.0	22.9	23.4	21.8	21.3	20.8	20.2	20.7	20.6	21.2
25-29	22.1	22.2	22.7	23.1	23.6	24.0	24.5	21.2	21.4	21.3	20.6	21.6	20.8	21.5
30-34	22.0	22.9	23.3	23.1	24.4	24.5	25.2	22.0	22.2	22.3	21.9	22.1	21.7	22.1
35-39	22.6	23.4	23.8	23.8	24.8	25.1	25.1	22.0	22.7	23.0	22.2	23.1	22.1	22.8
40-49	22.0	23.7	24.1	24.5	24.8	24.8	25.2	22.9	24.3	24.2	23.3	23.6	23.2	23.6
50-59	-	22.3	23.2	24.3	25.0	24.8	24.9	-	23.9	25.1	24.3	25.3	24.6	24.5
60-69	-	-	-	22.4	24.4	24.6	25.0	-	-	-	24.4	25.3	24.9	25.1

## 4. Blood Pressure

Classification	Systolic BP (mmHg)	Diastolic BP (mmHg)
normal	<120	<80
prehypertension	120-139	80-89
Hypertension-1	140-159	90-99
Hypertension-2	160-	100-

### \* Korean normal range with age

Age	Male		Female	
	Systolic	Diastolic	Systolic	Diastolic
15-19	110-134	59-79	101-123	57-75
20-29	113-137	64-84	103-125	60-78
30-39	114-142	67-89	106-134	63-83
40-49	126-150	71-95	112-146	68-90
50-59	121-159	73-97	117-159	70-94
60-69	124-166	73-95	124-166	71-93
70-	128-170	71-95	131-173	68-94

## 5. Blood glucose

구 분	normal	Control target
Fasting plasma glucose	70-100 mg/dL	80-130 mg/dL
Two-hour postload glucose	90-140 mg/dL	<180 mg/dL
glycated hemoglobin, HbA1c	<5.7%	<6.5%

### \* Korean BG reference standards

BG reference standards														
Age	M	F	Age	M	F	Age	M	F	Age	M	F	Age	M	F
20-24	91	88	31-32	94	89	41-42	98	92	51-52	100	95	61-62	101	97
25-26	91	88	33-34	95	90	43-44	98	92	53-54	100	95	63-64	101	97
27-28	92	88	35-36	95	90	45-46	99	93	55-56	101	96	65-66	101	97
29-30	93	88	37-38	96	91	47-48	99	94	57-58	101	96	67-68	101	98
			39-40	97	92	49-50	100	94	59-60	101	97	69-70	101	98

# Conclusions

- New work item proposal for systems integration visualization
  - Using H-Anim
  - No changes to H-Anim specification
- 3D digital human body information modeling
  - Anatomy and health information with 3D annotation
  - Position, orientation, and size
- Average Korean Model