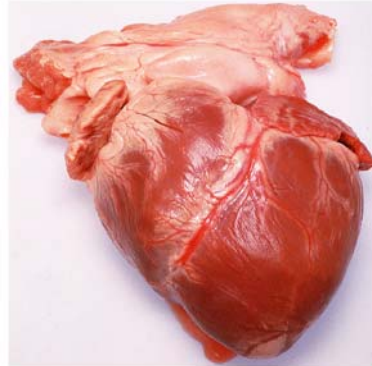


Embryonic Development of the Human Heart



(a)
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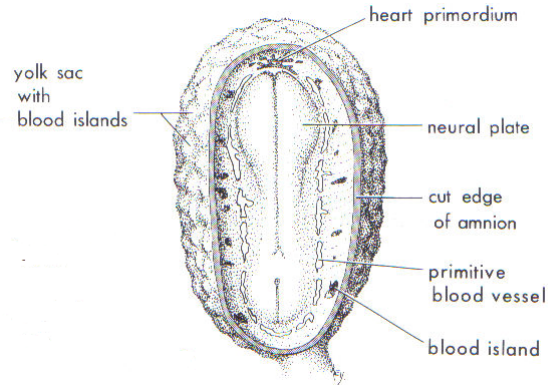
1. In order to progress through this part of the program, simply press the "space bar".
If you wish to return to a previous slide, press the "backspace" button on the keyboard.

Embryonic development of the heart – an introduction

From formation of the zygote up until the third week of development the embryo's demand for O_2 and nutrients is met by simple diffusion. During the third week of development however, O_2 cannot reach all cells in the embryo by diffusion. So, during the third week the cardiovascular system begins to develop in order to meet this increased demand for O_2 and nutrients. The cardiovascular system begins in the extraembryonic mesoderm of the yolk sac on day 17. Blood islands form in the splanchnopleuric mesoderm of the yolk sac wall. These blood islands begin to anastomose forming the initial vascular network. On day 18, embryonic vasculature begins to form as the blood islands fuse to form a primitive vascular network, extend towards and anastomose with the developing embryonic vasculature establishing a primitive circulatory system.

2. In order to progress through this part of the program, simply press the "space bar".
If you wish to return to a previous slide, press the "backspace" button on the keyboard.

Embryonic development of the heart – an introduction



The figure above shows the earliest stages of cardiovascular formation in which blood islands are forming, anastomosing, and growing towards the embryonic disc.

3. In order to progress through this part of the program, simply press the "space bar".
If you wish to return to a previous slide, press the "backspace" button on the keyboard.

Embryonic development of the heart – an introduction

A heart is required to pump blood through this new vascular system and as a result the heart develops in conjunction with the vascular system. The heart is actually derived from the developing vascular system. It begins its development as a pair of vascular elements, the endocardial tubes. The endocardial tubes like all of the vascular system are derived from the splanchnopleuric mesoderm; the endocardial tubes, however, are derived from a special horseshoe shaped region of splanchnopleuric mesoderm called the cardiogenic region. On about day 19 the endocardial tubes begin to develop from the cardiogenic region. The cardiogenic region is located cranial and lateral to the neural plate. Late in the third week, embryonic folding begins to move the endocardial tubes from their cranial and lateral position to a midline position, in what will become the thoracic region. Once the endocardial tubes have reached this midline position they fuse and form a primitive heart tube.

4. In order to progress through this part of the program, simply press the "space bar".
If you wish to return to a previous slide, press the "backspace" button on the keyboard.

Embryonic development of the heart – an introduction

Shortly after the primitive heart tube has formed it begins remodeling to attain the adult heart form. Externally, the primitive heart tube develops a series of constrictions and expansions, after which time the heart loops and folds into a characteristic “S” shape in order to establish the correct spatial relationships needed to accommodate the chambers of the mature heart. Internally, the heart is divided by septae into four separate chambers of the heart.

The following presentations show embryonic heart formation externally and internally during the first nine weeks of development.

5. In order to progress through this part of the program, simply press the “space bar”.
If you wish to return to a previous slide, press the “backspace” button on the keyboard.

External Development of the Heart

This program shows three dimensional clay models of different stages of human embryonic heart development. Each of these models is shown rotating 360°. These different models are intended to demonstrate the main events taking place in the external development of the human heart.

Directions:

By clicking on one of the links listed on **page 8** you will gain access to different models of various stages of external heart development. On each presentation set you will find the following four buttons on the top right side of the page.

Beginning – click this button if you wish to restart the presentation at any point.

Previous – click this button if you wish to go back to a previous view. This button will also stop rotation of the image. Press “Next” to resume rotation.

Next – this button will allow you to progress through the presentation more quickly. If you have paused the program for any reason it will allow you to progress through the program one slide at a time; if double clicked it will restart the programs automatic progression through the slides.

End – click this button to take you to the last slide in the series.

6. In order to progress through this part of the program, simply press the “space bar”.
If you wish to return to a previous slide, press the “backspace” button on the keyboard.

External Development of the Heart

Other buttons of interest:

Spacebar – this will progress you through the program one slide at a time if the program has been paused for any reason.

Escape button – this button takes you out of any of the presentations on the different stages of heart development and returns you to this page.

“s” button – this button will pause the presentation at any time.

“+” button – this button will restart the presentation any time it has been paused.

7. In order to progress through this part of the program, simply press the “space bar”.
If you wish to return to a previous slide, press the “backspace” button on the keyboard.

External Development of the Heart

[Day 21 of heart development](#)

[Day 23 of heart development](#)

[Day 25 of heart development](#)

[Day 28 of heart development](#)

[Day 35 of heart development](#)

[Adult form of the heart](#)

8. In order to progress through this part of the program, simply press the “space bar”.
If you wish to return to a previous slide, press the “backspace” button on the keyboard.

Internal Development of the heart

This program shows coronal sections of clay models of the human heart. These different models are intended to demonstrate the main events taking place during the internal development of the heart.

Directions:

By clicking on the link below you will gain access to these different heart models.

Once you have done this you will find four buttons in the upper right side of your screen:

Beginning – this button will return you to the very first slide in the series (week 4).

Previous – this button will move you to the previous slide in the series.

Next – this button will advance you through the series of stages one slide at a time.

End – this slide will take you to the last slide in this series (week 9+).

Note: For some of the different stages of heart development there is only one slide (weeks 4 & 5), all other stages (weeks) there are three different slides. If you are to navigate through this program you must do so one slide at a time (using the Next button, or the space bar). If at any point you wish to quit the program on internal development of heart, simply press the **"escape button"** on your keyboard; this will return you to this page.

[Link to internal development of the heart](#)

9.

In order to progress through this part of the program, simply press the "space bar". If you wish to return to a previous slide, press the "backspace" button on the keyboard.