

Background for Stem Cells Part 2

Continuation of lecture by Dr. Elaine
Fuchs through www.ascb.org
(iBioSeminar series)

Skin is the largest organ in the body, providing protection against the environment, protecting against dehydration, and serving as a sensory organ. Skin comes in several forms, including: feathers, scales, hair follicles, sweat glands, mammary glands. Stem cells generate each of these special forms.

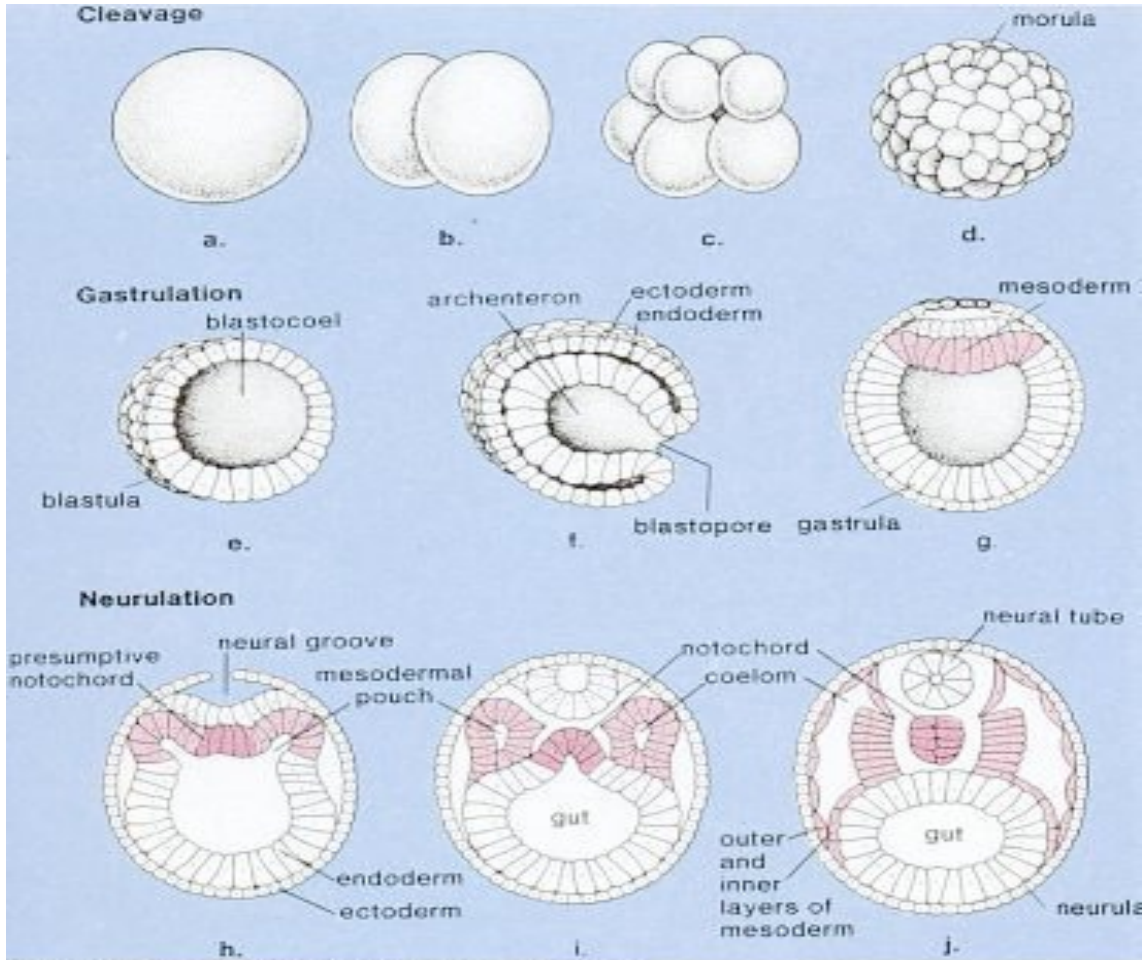
Questions for your consideration:

What are characteristics of adult stem cells?

Where do adult skin stem cells come from?

Can skin epidermal stem cells change their properties to give rise to other skin organs? (to be considered in continuation #3 of lecture)

Gastrulation



Embryonic Development of Lancelet :
Cleavage produces the morula
Gastrulation by invagination produces the three germ layers
Neurulation produces the neural tube called the neurula

During embryonic development, a complex series of cellular movements occurs during the process of gastrulation.

The three germ layers (ectoderm, endoderm, mesoderm) are formed during gastrulation and the body plan of the animal is established.

Note that epidermis is formed from surface ectoderm.

Transgenic animals

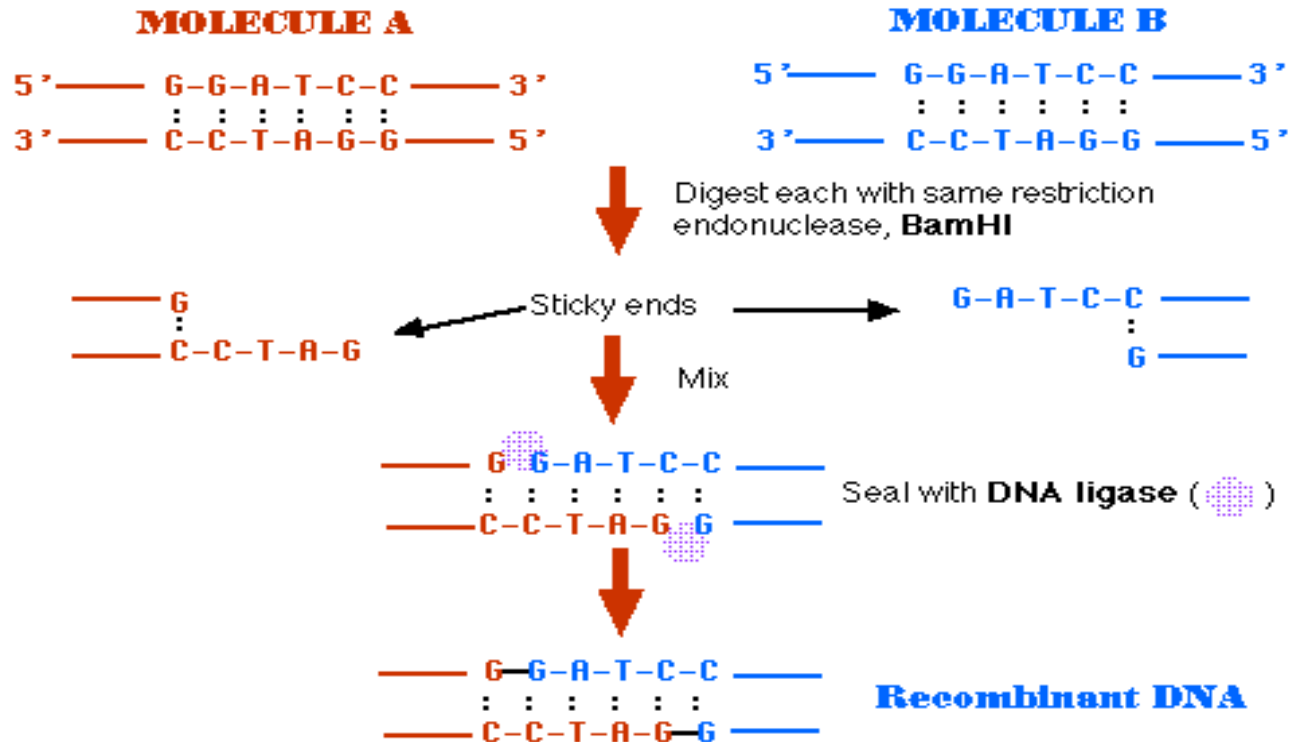
A transgenic animal carries a foreign gene(s) in its genome or has one of its own genes purposefully changed.

The foreign gene or gene fragment may be from the same species or from another species.

In some cases, one of the animal's own genes (endogenous gene) has been manipulated.

The foreign or endogenous gene has typically been manipulated using recombinant DNA technologies.

Recombinant DNA Technology



In order for the recombinant DNA to be replicated and expressed in a cell, it must be incorporated into a **VECTOR**. A vector is typically a virus or a plasmid that carries the recombinant DNA into a cell, thus **transforming** the cell (note that the cell has acquired a new gene(s) as a result of transformation).

In addition to the gene(s) of interest, the recombinant DNA includes other sequences:

1. The vector sequences enables the gene of interest to be incorporated into the DNA of the host cell
2. Promoter and enhancer sequences are necessary to enable the gene to be expressed by the host cells

Making transgenic mice:

Method 1: Transformation of ES cells with DNA of interest.

Method 2: Injection of male pronucleus with DNA of interest

