# DEVELOPMENTAL PHYSIOLOGY I

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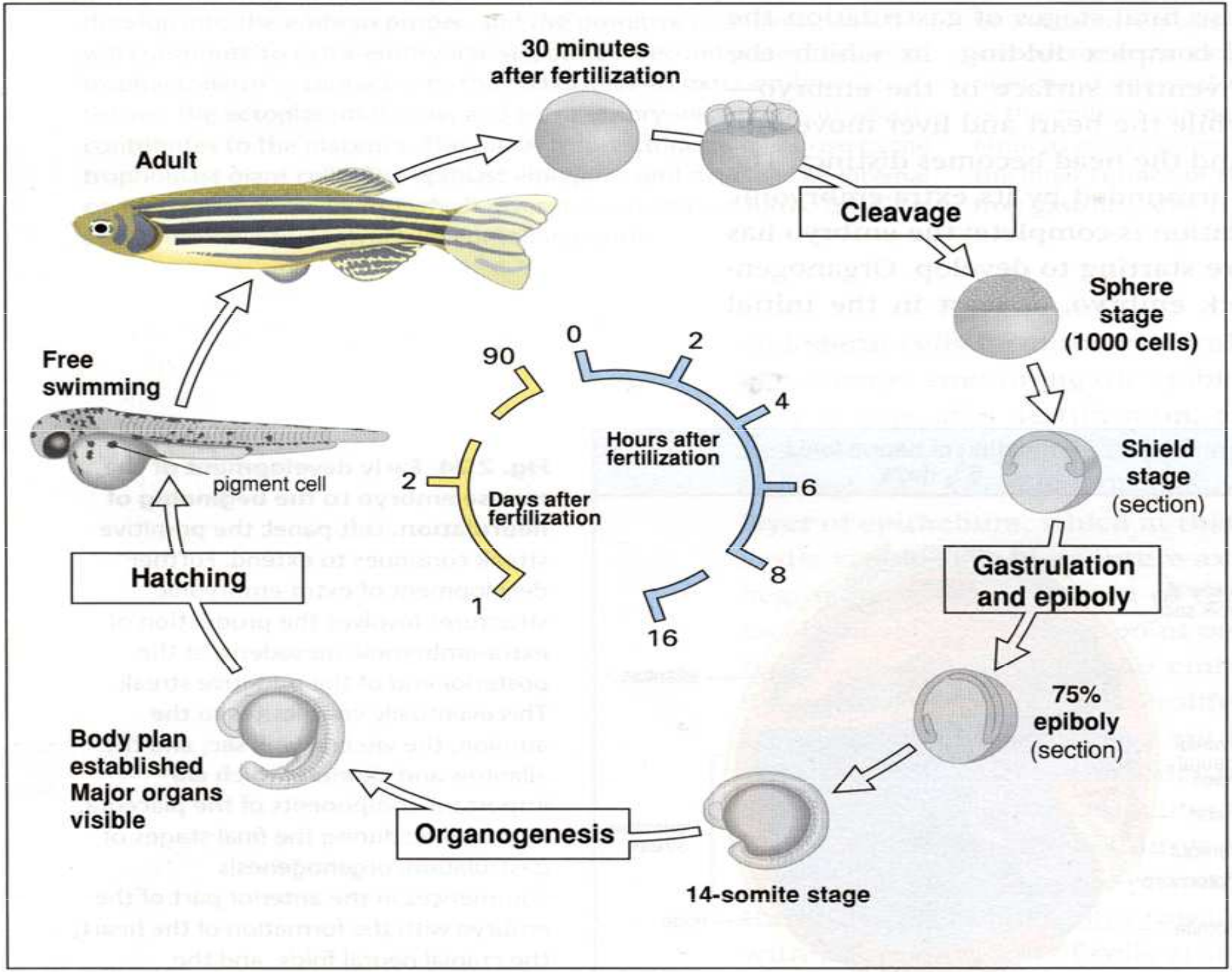
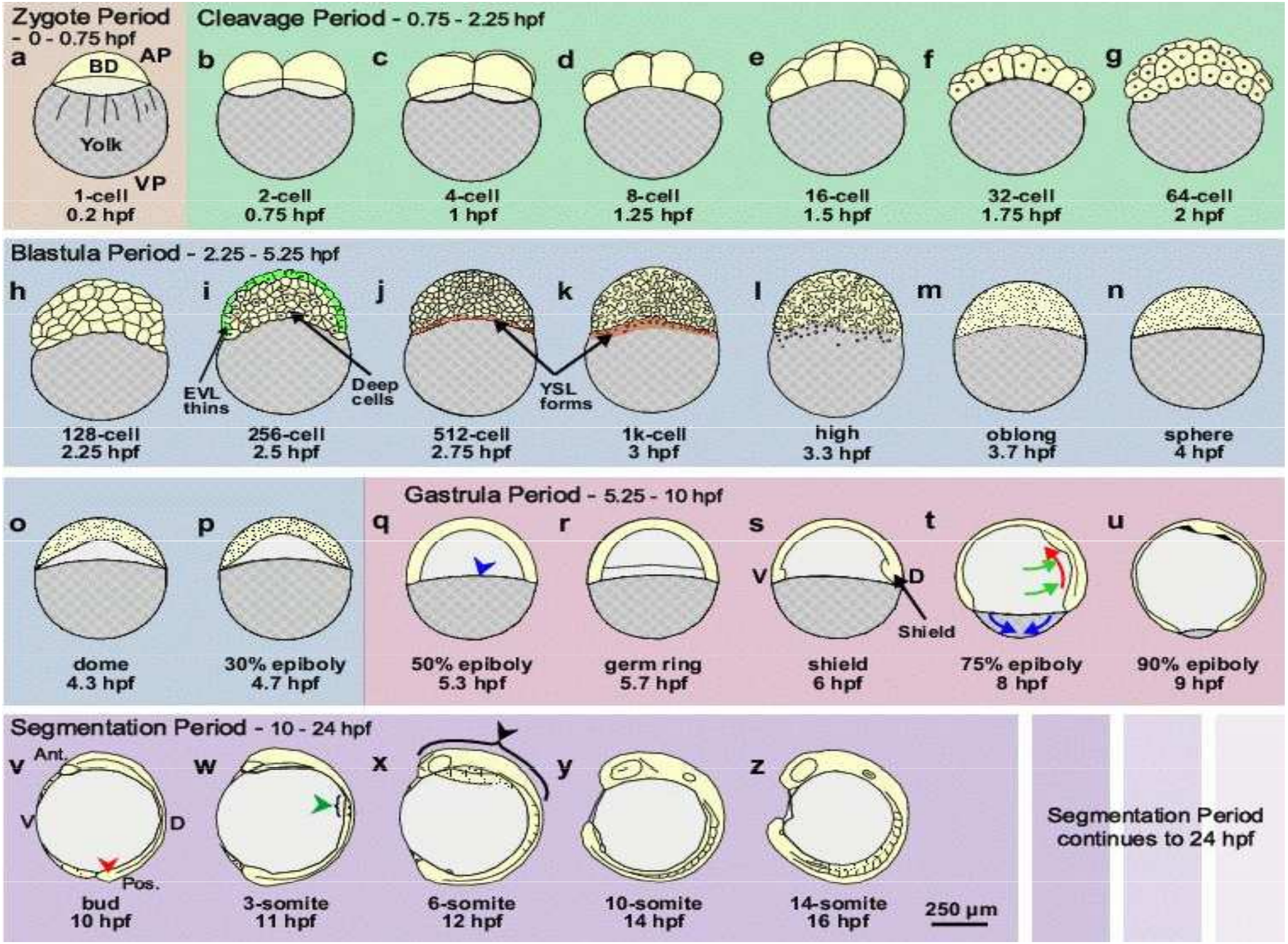
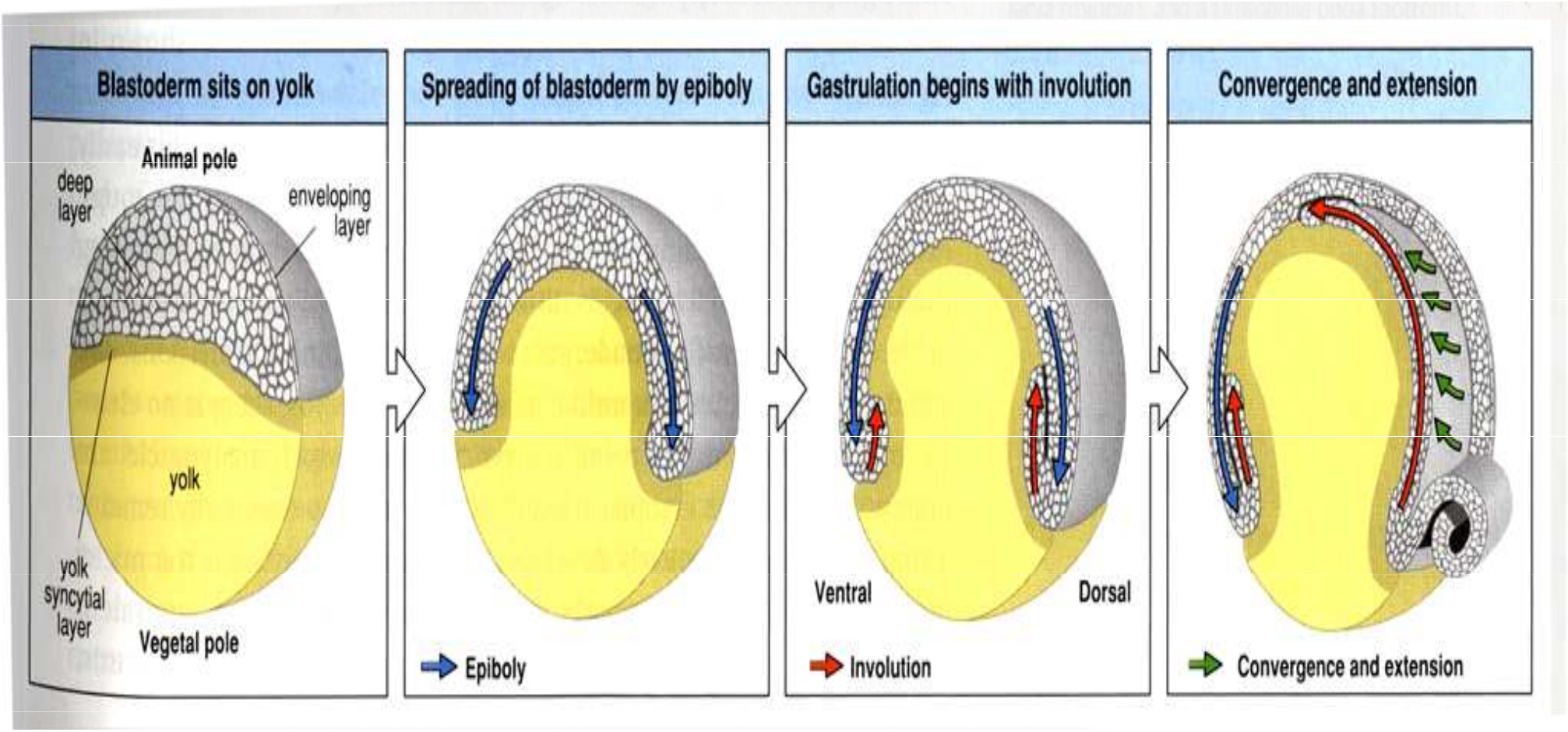
# DEVELOPMENTAL BIOLOGY

- central to all other areas of biology – unites cell biology, genetics and morphology
- in last 25 years grew into the most exciting and dynamic field of biology…..due to the advances in three main traditions: the experimental embryology, developmental genetics and molecular biology. All animals develop similarly, that including the worm, fly, fish or mammal.
- significant impact on society, in vitro fertilization, teratology, birth defects.
- future impact: functional genomics and functional proteomics, disease therapy, prenatal screening, transplantation, embryonal stem cells, therapeutic cloning.

**AMAZING NATURAL SPECTACLE AND A SOURCE OF INSPIRATION FOR ALL OTHER AREAS OF BIOLOGY**


30 minutes
after fertilization
Cleavage
Sphere
stage
(1000 cells)
Shield
stage
(section)
Gastrulation
and epiboly
75%
epiboly
(section)
14-somite stage
Organogenesis
Body plan
established
Major organs
visible
Hatching
Free
swimming
pigment cell
Adult
0
2
4
6
8
16
Hours after
fertilization
90
2
1
Days after
fertilization


Zygote Period
- 0 - 0.75 hpf
a
BD
AP
Yolk
VP
1-cell
0.2 hpf
Cleavage Period - 0.75 - 2.25 hpf
b
2-cell
0.75 hpf
c
4-cell
1 hpf
d
8-cell
1.25 hpf
e
16-cell
1.5 hpf
f
32-cell
1.75 hpf
g
64-cell
2 hpf
Blastula Period - 2.25 - 5.25 hpf
h
128-cell
2.25 hpf
i
EVL
thins
Deep
cells
256-cell
2.5 hpf
j
512-cell
2.75 hpf
k
YSL
forms
1k-cell
3 hpf
l
high
3.3 hpf
m
oblong
3.7 hpf
n
sphere
4 hpf
o
dome
4.3 hpf
p
30% epiboly
4.7 hpf
Gastrula Period - 5.25 - 10 hpf
q
50% epiboly
5.3 hpf
r
germ ring
5.7 hpf
s
V
D
Shield
shield
6 hpf
t
75% epiboly
8 hpf
u
90% epiboly
9 hpf
Segmentation Period - 10 - 24 hpf
v
Ant.
V
D
Pos.
bud
10 hpf
w
3-somite
11 hpf
x
6-somite
12 hpf
y
10-somite
14 hpf
z
14-somite
16 hpf
250 µm
Segmentation Period
continues to 24 hpf


Blastoderm sits on yolk
Animal pole
deep layer
enveloping layer
yolk
yolk syncytial layer
Vegetal pole
Spreading of blastoderm by epiboly
Epiboly
Gastrulation begins with involution
Ventral
Dorsal
Involution
Convergence and extension
Convergence and extension

# VIDEOS