

The Brain: CHD is more than the heart



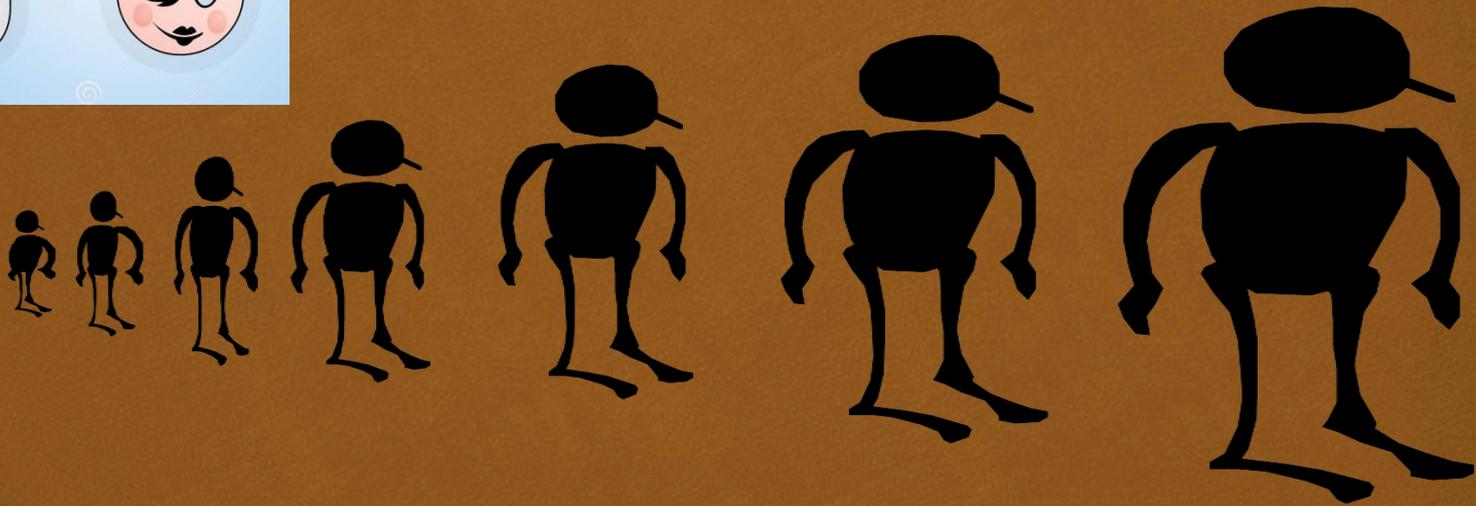
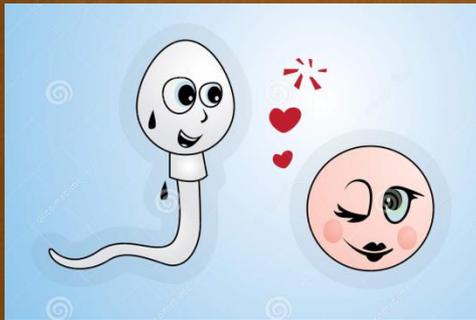
Stephen Crumb, DNP

Adult Congenital Heart Association

National Conference 2017



Where it all begins . . .





Did You Know

**...in fetal development
the heart forms and
starts beating before
the brain is
developed?**

Learn more at
<http://on.fb.me/explore-IHM>
where a free ebook is also
available to download.

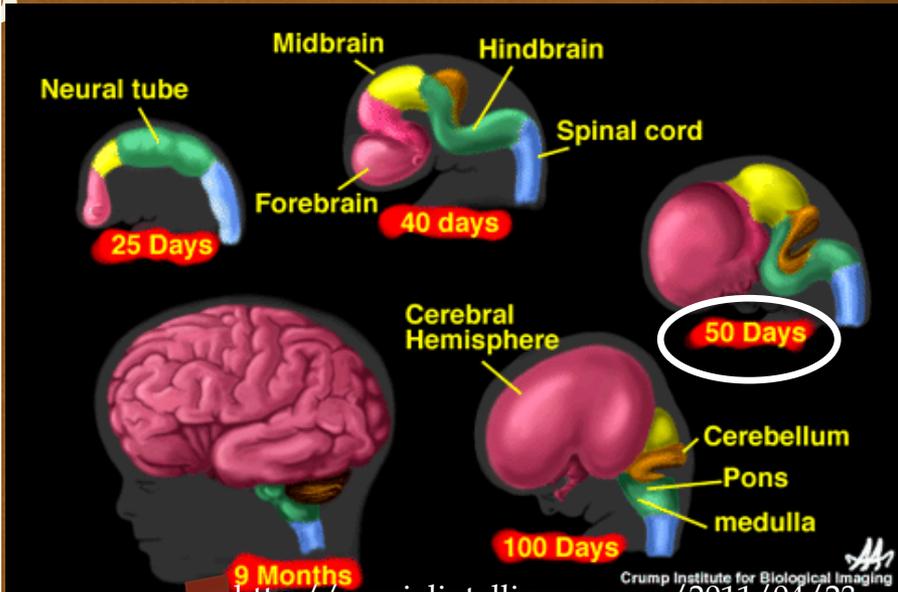
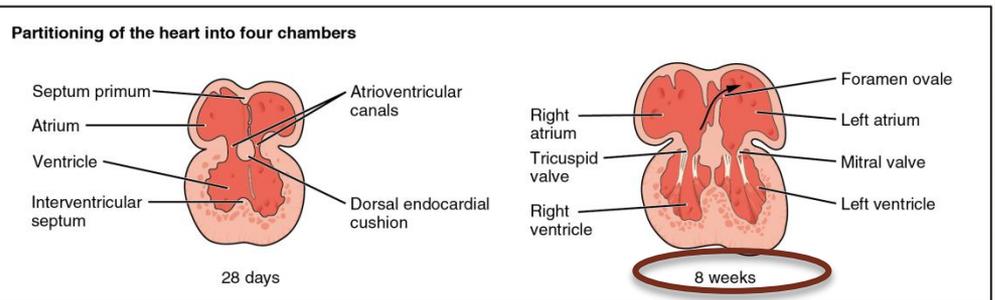
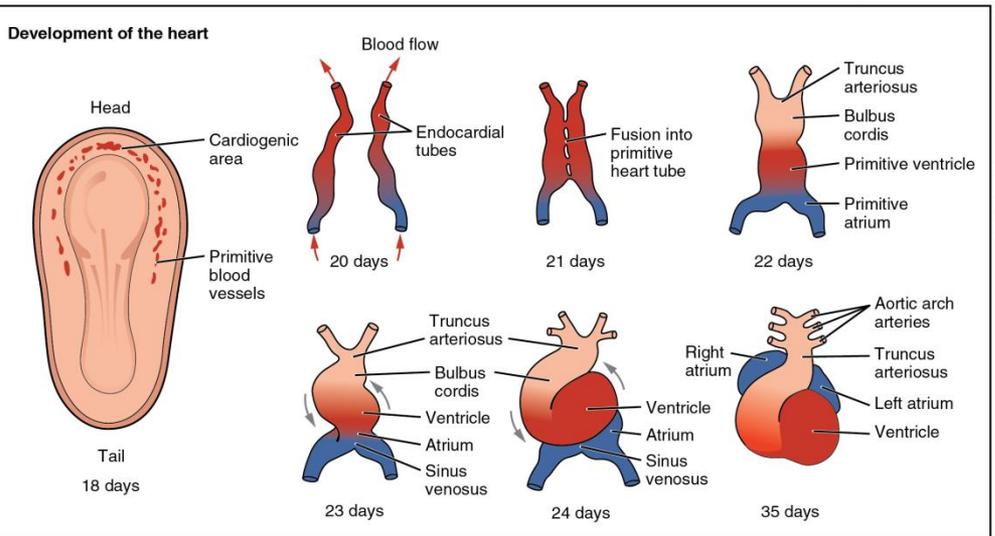


INSTITUTE OF HEARTMATH
Connecting Hearts and Minds

Pass it on: post this fact on your
wall and share this empowering
information with a friend.



Blood flow for nutrition



<http://cranialintelligence.com/2011/04/23>

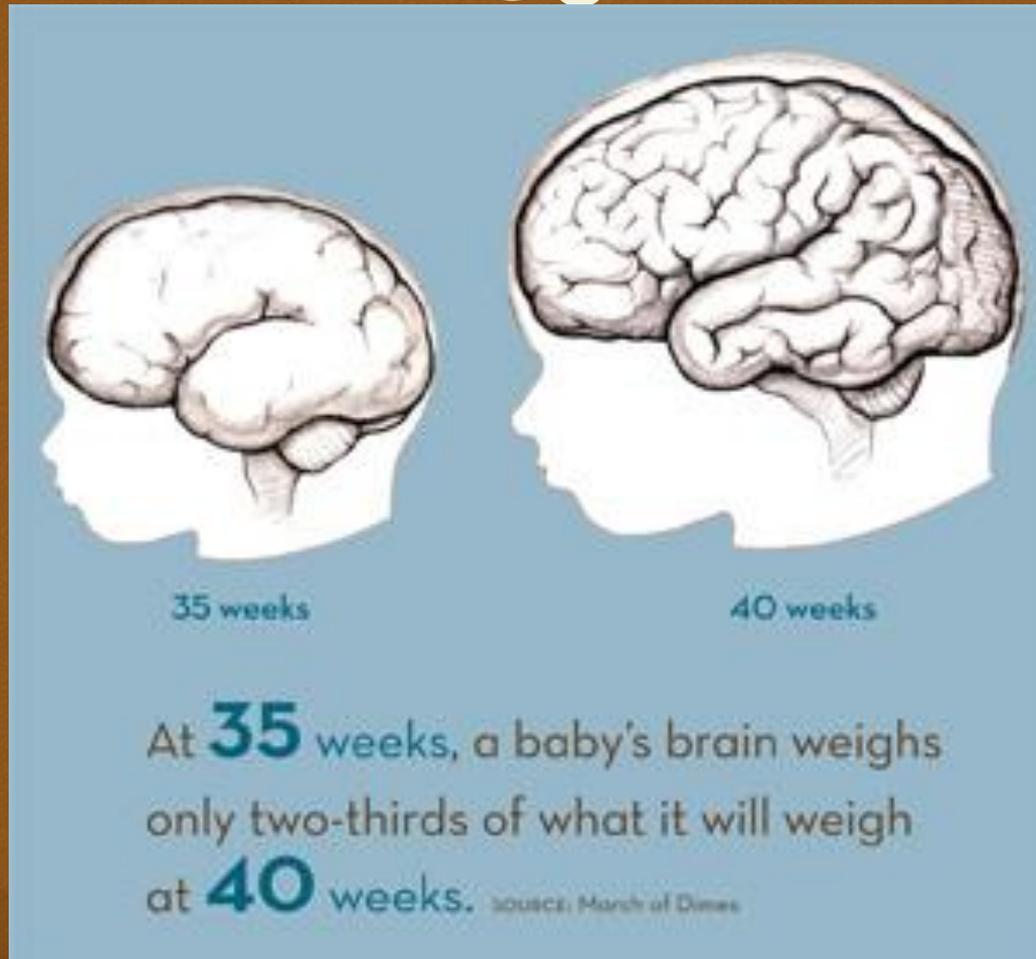
https://en.wikipedia.org/wiki/Heart_development

Nerves for regulation

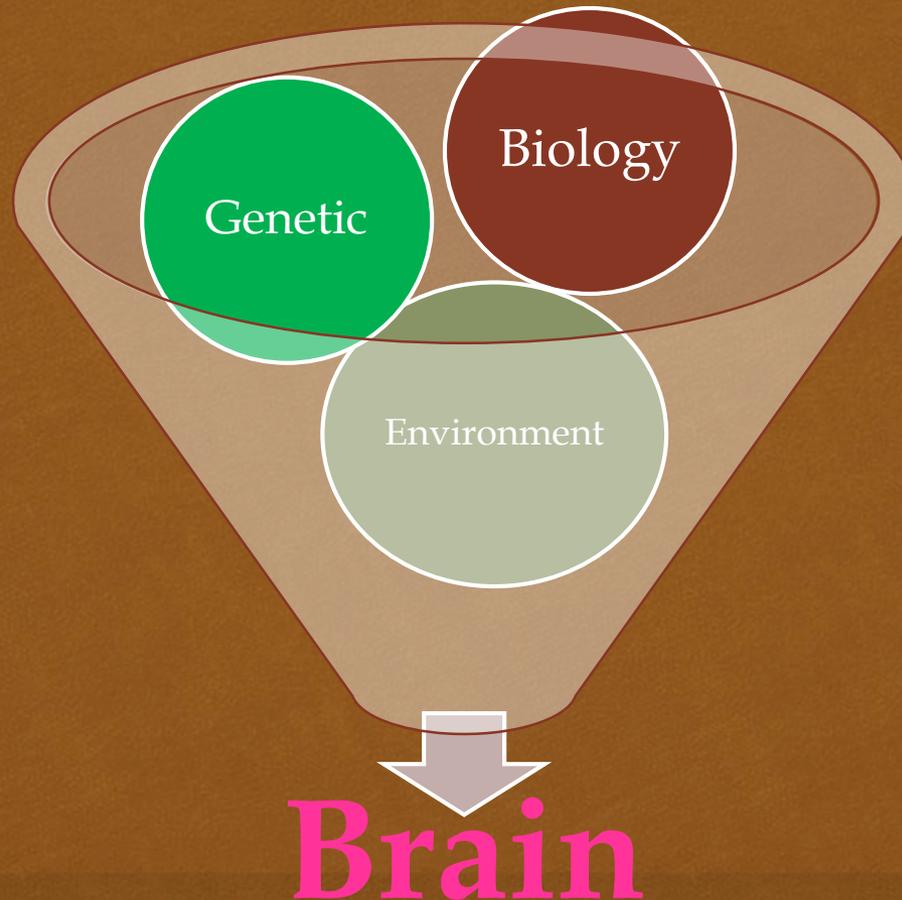


Full term (40 weeks) babies with CHD had brain development equal to only 35 weeks in babies without CHD

Licht et al. J Thorac Cardiovasc Surg. 2009;137:529.



What affects brain development?



Biology



❧ Abnormal circulation caused by the heart defect

❧ Low oxygen

❧ Low blood flow

❧ Treatments for the heart

❧ Surgery

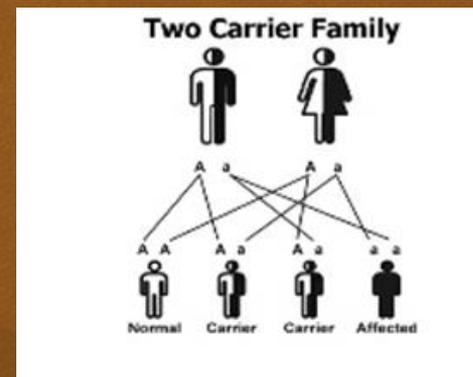
❧ Catheterizations



Genetic



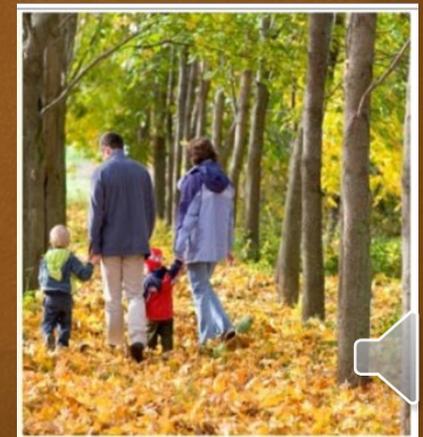
- ❧ Heredity is passing along characteristics to our children
- ❧ Characteristics of parents
 - ❧ Tall or short
 - ❧ Hair color
 - ❧ Eye color
- ❧ Sex
 - ❧ Some things are easier for girls, other things easier for boys
- ❧ Genetic Disorders
 - ❧ Down syndrome
 - ❧ Turner syndrome
 - ❧ Williams syndrome
 - ❧ Noonan syndrome
 - ❧ DiGeorge syndrome



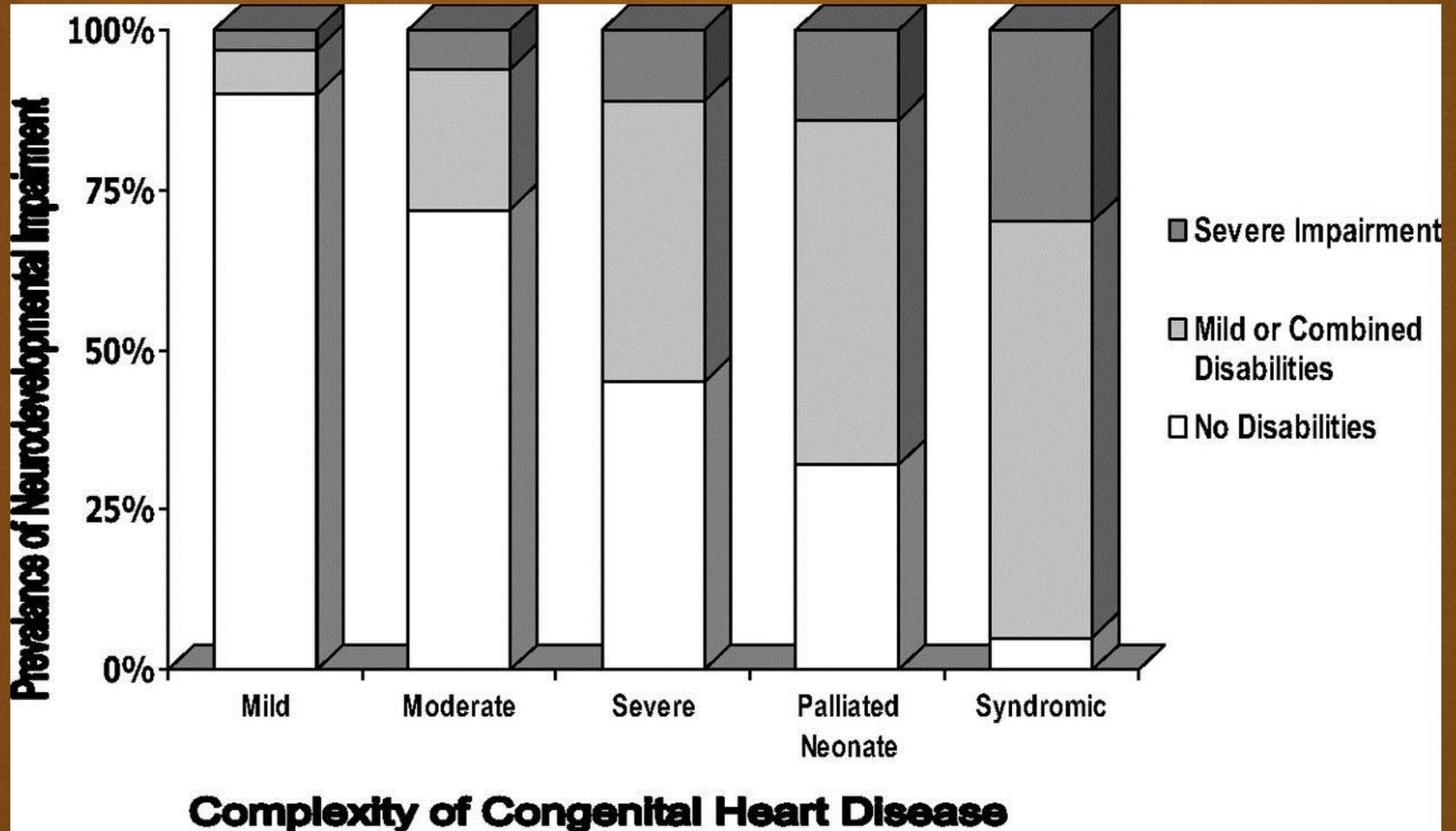
Environment



- ❧ Interaction between brain cells and their environment
 - ❧ Mother's nutritional status, exposure to tobacco, alcohol, drugs
 - ❧ Mother's exposure to infections
 - ❧ Rubella (German measles)
 - ❧ Herpes
 - ❧ Mother's medical conditions e.g. diabetes
- ❧ Family economic status
- ❧ Birth order
- ❧ Life events such as illness, injury, isolation
 - ❧ Repeated hospitalizations
 - ❧ Missed school
 - ❧ Limited socialization



Prevalence of neurodevelopmental impairment in the population with congenital heart disease (CHD).



Bradley S. Marino et al. Circulation. 2012;126:1143-1172



Brain changes result in behavioral changes.

- ⌘ Known by names such as learning, memory, maturation, fatigue, depression, PTSD, etc.
- ⌘ We have recognized a pattern among children with complex CHD:
 - ⌘ Mild cognitive difficulties
 - ⌘ Difficulties with social interactions
 - ⌘ Shorter attention span
 - ⌘ Impulsiveness
 - ⌘ Executive function is impaired



What else affects brain development?

☞ Experience!

- ☞ Alters brain activity
- ☞ Expression of genes
- ☞ Brain chemistry
- ☞ Behavior

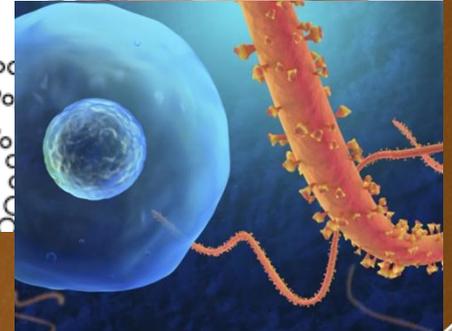
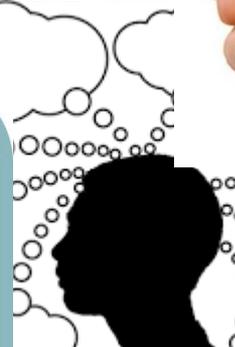


What is experience?

Everything that you experience before birth into adulthood...

Examples:

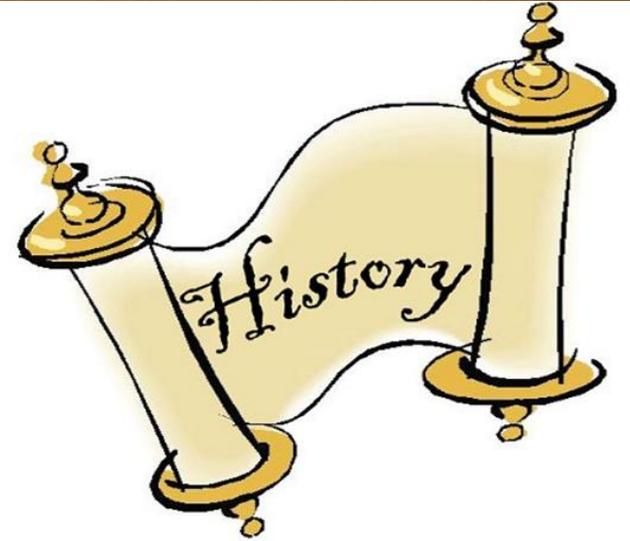
- sounds
- touch
- light
- food
- thoughts
- drugs
- injury
- disease...



Really?!

**IS THIS
OUR
DESTINY?**

Or just our
ℳ





Our Destiny is not written
for us, but by us

- Unknown



