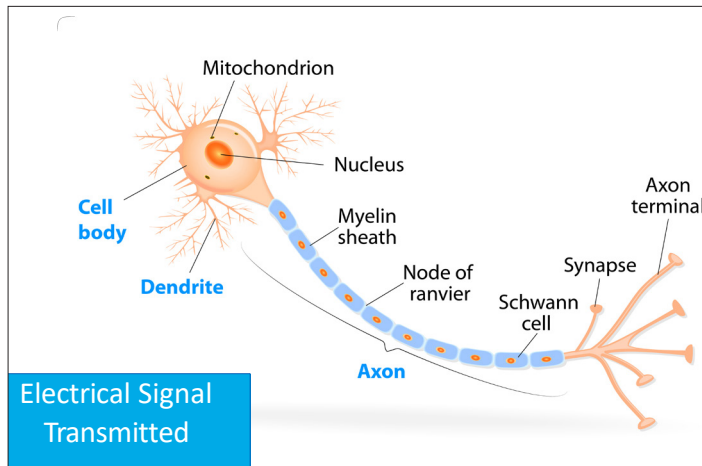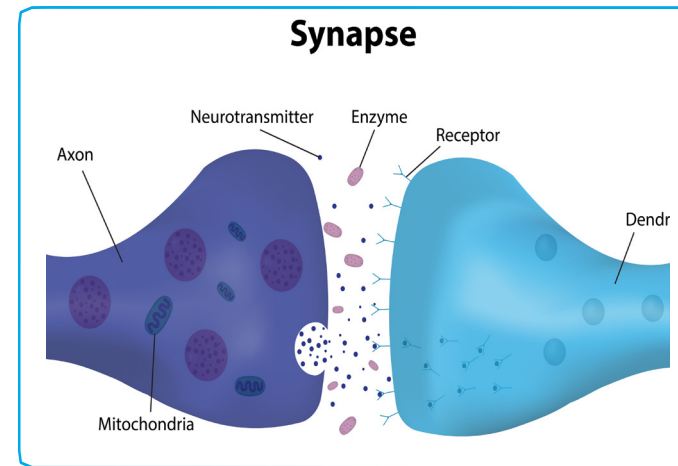# Early Experiences Help Shape Brain Development

Most neurons are formed in utero

Most synaptic development occurs after birth and through the first years

1. Every experience helps shape baby's brain

2. Development and organization of the brain reflects experiences

3. Repetitive, consistent, predictable and nurturing experiences can promote the healthy development of a child's brain

- Infant brain creates 1.8 million new synaptic connections per second

- Multisensory stimulation promotes survival of synaptic connections during brain development

- By age 3, 85% of brain is developed

Brain Development and the Role of Experience in the Early Years. Zero to three, 30(2), 9–13.
Eliot L. What's Going On in There? How the Brain and Mind Develop in the First Five Years of Life. New York, NY: Bantam Books; 1999.
Kolb B, et al. J Can Acad Child Adolesc Psychiatry. 2011;20(4):265–276.
Tierney, A. L., & Nelson, C. A., 3rd (2009).
World Health Organization. Integrating Early Childhood Development (ECD) Activities Into Nutrition Programmes in Emergencies. Why, What and How. 2014;1–16; 2

Touch is An Early Experience Contributing to Healthy Baby Development

Skin-to-skin contact for 25-120 minutes after birth has been shown to positively affect interactions between mothers and infants one year later

Touch is Fundamental for Typical Development

- Baby's first emotional bonds built on physical contact (touch) with parent or caregiver

- Touch has a positive effect on

  - Infants' motor and cognitive/ mental development

  - Breastfeeding

  - Parenting

- Without touch, children experience cognitive and neurodevelopmental delays

Infant Massage – One of the Most Effective Eorms of Touch with Benefits to Infants and Caregivers. Research Studies on Massage Demonstrated:

- Infant massage by mothers enhanced infants' circadian rhythm adjustment, improved sleep

- Infants who experienced routine touch and massage compared to those who did not showed 50% more eye contact and 3x more expression

- Fathers who massaged their infants showed more positive interactions

Bystrova K, et al. Early contact versus separation: effects on mother-infant interaction one year later. Birth. 2009;36(2):97–109.
Cullen, et al. Early Child Dev 2006; 164: 41-7
Cetinkaya, et al. Int J Nurs Pract 2012; 18: 164—9.
Ferber, et al. J Dev Behav Pediatr 2002; 23: 410—5.
Field, et al. Early Child Dev Care 2007; 168: 95—104.
Field, et al. J Dev Behav Pediatr 1995; 16: 105—11
Feldman, et al. Pediatrics 2002; 110: 16—26
Parikh et al., 2018; Intl J Rep, Contr, ObGyn, 12, 5011
Peláez-Nogueras M, et al. J App Dev Psychol. 1996;17(2):199—213

Sense of Smell Provides An Early Experience Contributing to Healthy Baby Development

Olfactory System

- Sensory organ (the olfactory epithelium and bulb)

- Specific olfactory brain regions (primary & secondary olfactory cortex)

- Scents can be detected based on small concentrations of odorant molecules

- Unique relationship exists among olfaction, memory, emotion
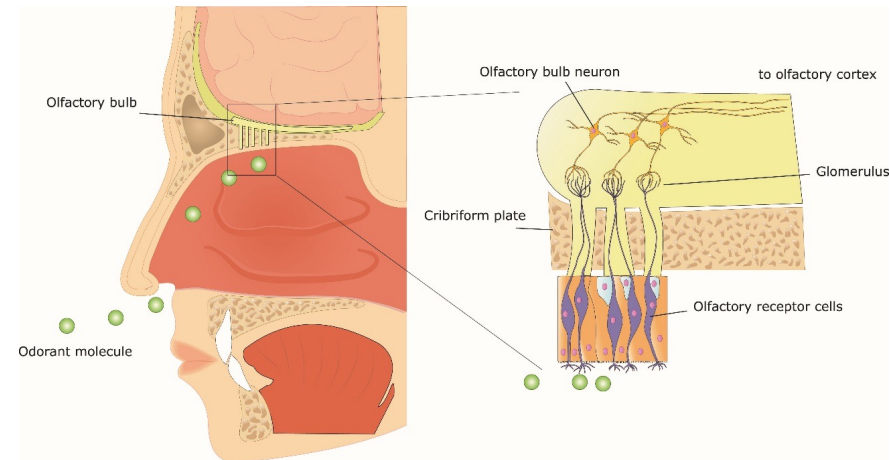
Sense of Smell — Key Role in Human Adaptation & Survival

- Infant sense of smell develops prenatally and develops rapidly after birth

- Central role in memory and emotion

- Contributes with other senses to mother-infant bonding

- Mother's odor combined with touch has soothing effect

Herz RS. Chem Senses. 2004;29:217-224.
Kivity S, et al. Isr Med Assoc J. 2009;11:238-243.
Sobel N. Neuron. 2005;48:431-454.
Stevenson RJ. WIREs Cogn Sci. 2013;4:273-284.   Sullivan RM, Toubas P. Biol Neonate. 1998;74:402-408.
Zelano C, Sobel N. Neuron. 2005;48:431-454.

Bedtime Routines Provide a Multisensory Experience for Healthy Baby Development

- Sleep impacts multiple aspects of functioning

- Parents' concerns over baby's sleep are universal

  - 20–75% report sleep problems

  - 96% desire to change something about their child's sleep

Cognitive functioning | Behavior | Social-emotional | Health | Family

Mindell & Owens (2015). *Clinical Guide to Pediatric Sleep.*

Research on Predictors of Positive Sleep Outcomes

- Bedtime before 9:00

- Regular sleep schedule sets internal clock

- Consistent bedtime routine

  - Same every night (30–45 mins)

  - 3-4 quiet activities (bath, massage, stories, cuddles)

- Bedtime routines are culturally specific

  - Most all include nursing, snack for older toddler

Collins et al. (2021). International Pediatric Sleep Association annual meeting.
Mindell et al. (2010). Sleep Medicine.
Mindell & Owens (2015). Clinical Guide to Pediatric Sleep.

Everyday Routines Include Multisensory Experiences for Healthy Baby Development

Touch (skin-to-skin, massage, bath, cuddling, dressing)

Smell (bathing, snuggling, experiencing smells of baby's world)

Taste (feeding, teeth brushing)

Sight (direct eye contact with parent)

Sound (reading, lullabies, talking)