1. How your baby’s brain WORKS
2. What HARMS your baby’s brain
3. What HELPS your baby’s brain
4. YOUR parenting brain

It is necessary to work with Nature, and not against her if we are to promote health and well-being in young children, their mothers and society.

... we can aim to bring our society, that we can change, into better harmony with our biological “givens” that we cannot change ...

Infancy cannot be re-run later.

(Peter Cook)

How do we make parenting choices ??
For some - this information might be hard!

Not to look back not to feel guilty!!

Rather look forward - what to do differently

What does my baby’s basic biology need?

MUM!! 😊 and Dad!!

Skin-to-skin contact → SAFE → growth for brain-wiring

Sleep - completing brain circuits

Breastmilk
Small feeds often (every 60-90 mins)
Bottle gets too much too fast → reflux/colic?

Bonding and attachment
No separation, no prolonged crying

The baby’s growth depends on
DO I FEEL SAFE?

What helps your baby’s brain?....

SAFE
Mothers ANS helps the Baby’s ANS to find healthy set points. Baby needs mothers presence and safety to do this! When these are settled the baby will be able to SELF REGULATE or reach stability on her own. She can cope with change and come back to stability.

**SKIN-TO-SKIN CONTACT**

Babies need...

**Firm touch, Holding and carrying**

**PRACTICAL**

- What can you do if your baby is crying?
- **COMFORT HER!**
- Meet her needs
  - Contain, still holding
- Her hands near mouth
- Gentle care
- Watch how your own baby copes
- Minimise stress
- **NO CONTROLLED CRYING!!**

**Human touch and hugs are vital throughout life**

"Traditional cultures“ have this carrying right

Infant care patterns in 186 non-western cultures:

- newborn is carried constantly, always sleeps with mother
- immediate feeding if crying
  - feeding on demand,
  - every hour or two
  - breastfeeding for 24 months

How long to do skin-to-skin contact??

All babies at birth, on chest for 1st 6 hours (Dad should help 😊)
First 2-6 weeks in KangaCarrier (baby will decide 😊)
Prems continuously while LBW (2-3kgs), then let baby decide
then as baby gets heavier carry nearer your spine, in front carrier then back carrier

(Lozoff and Brittenham, J Pediatrics 1979; 95:478)
MOTHER BABY TOGETHERNESS: MUTUAL EMPOWERMENT

KangaCarrier

Mother is a superior incubator

a kind of invisible hothouse
... through several pathways at once ...

Technique: AIRWAY PROTECTED!

NOTE SENSORY ASPECTS:

SMELL  mother familiar, safe
TASTE  hands breast → mouth
CONTACT (firm pressure) ANS
MOVEMENT familiar, reassures
SOUND  muffled by chest / shirt
SIGHT  darker in shirt (<200lux)
TOUCH  (light) only when awake !!

KangaCarrier ensure optimal
SENSORY ENVIRONMENT.

a kind of invisible hothouse

“the wiring of the brain’s pathways is best supported when it can integrate quality sensory input through several pathways at once, particularly during critical periods of development.”  (McCain 1999)

Visual experience is essential to continued development of the visual system ....

... the critical period is from the latter part of 2nd trimester through the first 3 years of life.

SIGHT

Below 30w GA, fetus has no pupillary constriction, adequate only after 34w GA

Eyelids below 32 weeks do not limit light entry.

“In utero, not exposed to light”

Much of this development occurs unrelated to stimuli or experience, but there are continuous “spontaneous synchronous retinal waves”

RECOMMENDED ILLUMINATION

<table>
<thead>
<tr>
<th>Place</th>
<th>0</th>
<th>1000 lux</th>
<th>2000</th>
<th>3000 ///</th>
<th>20K - 50K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conference Room</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctors' office</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Clerk's office</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Typist office</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Drafting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assembly line</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEWBORN / INFANT</td>
<td>200 lux</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photophobia</td>
<td></td>
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<tr>
<td>Phototherapy</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
SIGHT:
AT BIRTH:
DIM THE LIGHTS !!

Phototherapy... Check eye pads tight fit

Turn baby to face away from window so she sleeps better
Avoid flashes when photographing

SOUND

“Effects of the NICU on auditory attention and distraction”

Ear sends signals to CNS by 23w GA
External sounds all heard – but very dampened
Mothers voice distinguishable .... salient
tied to circadian rhythms
and vestibular and other sensations.
(Voice discrimination ... early language)

Auditory development drives visual and motor development ...

... auditory signal attracts attention , motor system turns head
and eyes ...

Neonates are unable to focus auditory attention
They listen simultaneously to everything
... unexpected sounds ...
... brain reveals a limited ability to maintain stable physiologic, motor, or behavioural state and attentional system function ...

Hearing thresholds (decibel)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold of pain</td>
<td>134</td>
</tr>
<tr>
<td>hearing damage - short-term effect</td>
<td>+/- 120</td>
</tr>
<tr>
<td>jet engine, 100 m distant</td>
<td>110-140</td>
</tr>
<tr>
<td>jackhammer, 1 m distant / discotheque</td>
<td>+/- 100</td>
</tr>
<tr>
<td>hearing damage - long-term exposure</td>
<td>+/- 85</td>
</tr>
<tr>
<td>traffic noise major road, 10 m distant</td>
<td>80-90</td>
</tr>
<tr>
<td>moving automobile, 10 m distant</td>
<td>60-80</td>
</tr>
<tr>
<td>TV set - typical home level, 1 m distant</td>
<td>+/- 60</td>
</tr>
<tr>
<td>normal talking, 1 m distant</td>
<td>40-60</td>
</tr>
<tr>
<td>very calm room</td>
<td>20-30</td>
</tr>
</tbody>
</table>
### Hearing thresholds (decibel)

<table>
<thead>
<tr>
<th>Threshold of Pain</th>
<th>134</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing Damage - Short-term Effect</td>
<td>+/- 120</td>
</tr>
<tr>
<td></td>
<td>110-140</td>
</tr>
<tr>
<td></td>
<td>+/- 100</td>
</tr>
<tr>
<td>Hearing Damage - Long-term Exposure</td>
<td>+/- 85</td>
</tr>
<tr>
<td>Baby Dysregulated</td>
<td>80-90</td>
</tr>
<tr>
<td>Baby Aroused</td>
<td>60-80</td>
</tr>
<tr>
<td>Baby Sleeps Okay</td>
<td>+/- 60</td>
</tr>
<tr>
<td>Very Calm Room</td>
<td>20-30</td>
</tr>
</tbody>
</table>

### Sound

Mothers' voice calms unexpected strange sounds

### Smell

Hearing drives eyes and movement development...

Newborns prefer amniotic fluid (AF) smell > milk

Breast/bottle fed babies offered choice of amniotic fluid versus familiar milk...

- **Breast**
  - d2: 50% AF 50% milk
  - d4: 0% AF 100% milk
- **Bottle**
  - d2: 100% AF 0% milk
  - d4: 100% AF 0% milk

(preven though this milk satiates 4 hourly !!)

Premies fed through non-oral pathways lack sucking-breathing-swallowing coordination integration of chemosensation-food intake cephalic phase of digestive processes; therefore display: “poorer and more unstable sucking performance than their orally fed peers”

### Disgust and Alcohol

Perfumes on breasts not good!!
Birth is a window of opportunity!
Why?
Hormones of birth:
Progesterone
Lactation starts
In mother prolactin rises → milk
Oxytocin rises releases milk
Baby-mother eye-to-eye contact
Baby’s mouth on breast

Critical period concept

“Windows of opportunity in early life when a child’s brain is exquisitely primed to receive sensory input in order to develop more advanced neural systems.”
R Shore

SENSATIONS THAT WIRE BRAIN

SEES
Mum’s eyes

SMELLS
Mum’s milk

TASTES
Mum’s milk

Hand TOUCH
Mum’s skin

Skin-to-skin CONTACT

Ear HEARS
Mum’s voice

MOVES
with Mum’s

Back FEELS
Mum’s arm holding

WARMED on
Mum’s front

Opening eyes is a sign
that baby feeling safe
When eyes connect, circuits in
mother’s brain and baby’s brain
synchronise.
This is how bonding begins

• Watch your own baby for her individual sensitivities, and her own small signals of distress and peacefulness.
• what works for you together.
• you are the experts on your own baby!
• trust yourselves!!!

Watch your baby’s individual sensitivity to:
light
sound
Touch
Strong smells...
“Behaviour of the infant is its primary way to communicate”
H.ALS
What does my baby’s basic biology need?
MUM!! 😊 and Dad!!

**Skin-to-skin contact ➔ SAFE ➔ growth** for brain-wiring

**Sleep** - completing brain circuits

**Breastmilk**
Small feeds often (every 60-90 mins)
Bottle gets too much too fast ➔ reflux/colic?

**Bonding and attachment**
No separation, no prolonged crying

Basic Biological Need

**SLEEP**
For Mum and baby

Cosleeping???

Not like this!! 😊

Cosleeping ➔ safely!!
side cot
-in arms reach

Flat mattress, no pillows
What does my baby’s basic biology need?

MUM!! 😊 and Dad!!

**Skin-to-skin contact** → SAFE → growth for brain-wiring

**Sleep** - completing brain circuits

**Breastmilk**
Small feeds often (every 60-90 mins)
Bottle gets too much too fast → reflux/colic?

**Bonding and attachment**
No separation, no prolonged crying

---

**Your Baby’s Brain:**
the latest neuroscience

3. What HELPS your baby’s brain

The role of the sensory environment:

**Breastfeeding, breast milk**
and the IQ debate

---

**SENSORY STIMULATION**

**SENSORY ORGAN**

**BREAST - FEEDING** = **BRAIN - WIRING**

**SOCIAL ORGAN**

---

**The First Idea**

... these "uniquely human abilities" are learned;
not passed on genetically or through natural selection.

Greenspan & Shanker 2006
Something as subtle and complex as intelligence was never going to be pinned on just a handful of genes, as a huge trawl across the human genome seems to confirm. Although it did turn up hundreds of genes that make a contribution, their individual effects are so small that for the most part they are barely detectable. This does not mean, however, that intelligence is not inherited. The research, led by Robert Plomin of the Institute of Psychiatry in London, identified six genes that were strongly associated with high or low intelligence, but even the most powerful of these accounted for just 0.4 per cent of the variation in intelligence between individuals. The six together accounted for about 1 per cent of the variation in intelligence.

Alternatively:

there is no gene for intelligence !!!

in response to breastfeeding. In Dunedin, breastfed children carrying the C allele showed a 0.4-IQ-point advantage relative to children not fed breast milk ($t = 0.35, P = 0.001$). In contrast, GG homozygotes neither gained an advantage from breastfeeding nor suffered a disadvantage from not being fed breast milk ($t = 0.50, P = 0.62$) (Fig. 1A). Turning to the E-risk cohort, we found that breastfed children carrying the C allele showed a 0.4-IQ-point advantage relative to children not fed breast milk ($t = 0.35, P = 0.001$), whereas GG homozygotes neither gained an advantage from breastfeeding nor suffered a disadvantage from not being fed breast milk ($t = 0.22, P = 0.83$) (Fig. 1B).

BUT:

there is a gene for breastfeeding to improve intelligence !!!

"FADS2" breastfeeders →
New Zealand  + 6 IQ
Scotland  + 7 IQ
**Fat**

- Energy
- Fat soluble vitamins
- Milk fat consists of ~98% triglycerides and more than 400 different fatty acids

**TRIGLYCERIDE**

**Left:** glycerol, 
**Right:** palmitic acid, oleic acid, alpha-linolenic acid

In phospholipid, glycerol molecule same, two fatty acids esterified

Phospholipids are a major component of all biological membranes, Sphingomyelin particularly concentrated in BRAIN major part of MYELIN.

**TRIGLYCERIDE**

**MYELIN**

Dendrification and myelinisation peaks occur at 2 and 6 months, is maximal at one year...

At one year: human milk has less protein, but MORE TRIGLYCERIDE!!

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Cow (wt/wt)</th>
<th>Human (wt/wt)</th>
<th>Rat (wt/wt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:0</td>
<td>2.6</td>
<td>1.4</td>
<td>4.0</td>
</tr>
<tr>
<td>6:0</td>
<td>1.3</td>
<td>3.0</td>
<td>0.7</td>
</tr>
<tr>
<td>8:0</td>
<td>1.8</td>
<td>5.1</td>
<td>0.0</td>
</tr>
<tr>
<td>10:0</td>
<td>3.1</td>
<td>3.1</td>
<td>0.0</td>
</tr>
<tr>
<td>12:0</td>
<td>2.3</td>
<td>4.0</td>
<td>0.0</td>
</tr>
<tr>
<td>14:0</td>
<td>7.0</td>
<td>2.0</td>
<td>0.0</td>
</tr>
<tr>
<td>16:0</td>
<td>27.5</td>
<td>20.2</td>
<td>22.6</td>
</tr>
<tr>
<td>16:1</td>
<td>2.0</td>
<td>5.7</td>
<td>1.9</td>
</tr>
<tr>
<td>17:0</td>
<td>0.5</td>
<td>0.3</td>
<td>0.0</td>
</tr>
<tr>
<td>18:0</td>
<td>8.2</td>
<td>5.9</td>
<td>6.5</td>
</tr>
<tr>
<td>18:1</td>
<td>15.4</td>
<td>36.4</td>
<td>26.7</td>
</tr>
<tr>
<td>18:2</td>
<td>13.0</td>
<td>16.3</td>
<td>0.0</td>
</tr>
<tr>
<td>CLA</td>
<td>0.47</td>
<td>0.8</td>
<td>1.4</td>
</tr>
<tr>
<td>18:3</td>
<td>0.8</td>
<td>1.4</td>
<td>0.8</td>
</tr>
</tbody>
</table>

**FATTY ACIDS ARE SPECIES SPECIFIC**

Up to 6 months, milk is 7.4% fat, but after 12 months it is 10.7%
**Results:** The experimental intervention led to a large increase in exclusive breastfeeding at age 3 months (+3.3% for the experimental group vs. 6.4% for the control group; P < .001) and a significantly higher prevalence of any breastfeeding at all ages up to and including 12 months. The experimental group had higher means on all of the Wechsler Abbreviated Scales of Intelligence measures, with cluster-adjusted mean differences (95% confidence intervals) of +7.5 (+0.8 to +14.3) for verbal IQ, +2.9 (-3.3 to +9.1) for performance IQ, and +5.9 (-1.0 to +12.8) for full-scale IQ. Teachers’ academic ratings were significantly higher in the experimental group for both reading and writing.

Verbal IQ  +7.5  Full-scale IQ  +5.9

---

**Breastfeeding and Child Cognitive Development**

New Evidence From a Large Randomized Trial

Michael S. Kramer, MD; Piazza Kibony, PhD; Zina Mansour, MD; Vina Sanghavi, MD, MS; Robert W. Platt, PhD; Laka Makuta, MD, MS; Sergio Janes, MD, PhD; Lilia Wernicke, MS; Natalia Rezende, MD, MS; Henzy Chorn, MD; Jean-Paul Cellier, MD; Bereney Cha布; Dri, PhD; Zila Hubner, PhD; Jorge Amsden, MD, MS; Ozzy Mangharam, MD, MS; Ozzy Ennies, MD; A. McLaughlin Frayne, PhD; Stanley Shopter, PhD; for the Promoting Breastfeeding Intervention Trial (PROMBIT) Study Group

---

**Neuronal Plasticity**

"the first three years are decisive"

→ platform for subsequent development of higher cognitive functions.
GIVING GLUCOSE WATER

(Martin-Calama et al 1997) 180 infants
90 exclusive breastfeeding from birth.
90 extra glucose water AFTER breastfeed, 3 days.

Weight loss d1-2  slightly less
Weight loss d3  no difference
Serum glucose d1  slightly higher
Serum glucose d2  no difference

Exclusive breastfeed 1/12
Breastfeeding 4 months  50% 80%

significantly more

BREASTFEEDING AND SMOKING

<table>
<thead>
<tr>
<th>SMOKING MOTHER</th>
<th>BREAST MILK VOLUME / DAY</th>
<th>14 DAY WEIGHT GAIN PER BABY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>693 ml</td>
<td>340 g</td>
</tr>
<tr>
<td>NON – SMOKER</td>
<td>961 ML</td>
<td>550 g</td>
</tr>
<tr>
<td>DIFFERENCE</td>
<td>30 % LESS</td>
<td>40 % LESS</td>
</tr>
</tbody>
</table>

BRAIN GROWTH & BREASTFEEDING - HOMO SAPIENS

for BRAIN
for BRAWN

BREAST - FEEDING = BRAIN - WIRING

(In the context of divorce ... )

“The mother shall give suck to their offspring, for two complete years”
- Quran Surah II (Baqarah) verse 233

suckling rights of the infant over ride father’s rights to child.
DIFFERENT MAMMALIAN CARE PATTERNS EMERGE:

1. **CARRY CARE** - relatively immature
   immature / altricial, requires heat
   altricial, needs warmth

2. **NESTING** - a little more mature
   altricial, needs warmth

3. **CACHE CARE** - quite mature
   can warm self

4. **FOLLOW** - precocial, mature at birth
   can fend for self!

---

### MAMMALIAN FEEDING FREQUENCY AND MILK PROTEIN FAT CONTENT

**CACHE** - e.g. deer

- **Protein and Fat Concentration**
  - High: 16 g/l

**NEST** - e.g. cat

- **Protein and Fat Concentration**
  - High: 8 g/l

**FOLLOW** - e.g. zebra

- **Protein and Fat Concentration**
  - High: 4 g/l

**Time Interval Between Feeds**

- 0 hours
- 12 hours
- 4 hours

---

**Species**

<table>
<thead>
<tr>
<th>Species</th>
<th>Water (%)</th>
<th>Fat (%)</th>
<th>Casein (%)</th>
<th>Whey (%)</th>
<th>Lactose (%)</th>
<th>Ash (%)</th>
<th>Energy (kcal/100g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human</td>
<td>87.1</td>
<td>4.5</td>
<td>0.4</td>
<td>0.6</td>
<td>7.1</td>
<td>0.2</td>
<td>72</td>
</tr>
<tr>
<td>Cow</td>
<td>87.3</td>
<td>3.9</td>
<td>2.6</td>
<td>0.6</td>
<td>4.6</td>
<td>0.7</td>
<td>66</td>
</tr>
<tr>
<td>Horse</td>
<td>88.8</td>
<td>1.9</td>
<td>1.3</td>
<td>1.2</td>
<td>6.2</td>
<td>0.5</td>
<td>52</td>
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<tr>
<td>Dog</td>
<td>76.4</td>
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<td>2.3</td>
<td>3.3</td>
<td>1.2</td>
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<td>Dolphin</td>
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<td>Reindeer</td>
<td>66.7</td>
<td>18.0</td>
<td>8.6</td>
<td>1.5</td>
<td>2.8</td>
<td>1.5</td>
<td>214</td>
</tr>
</tbody>
</table>

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**40 million years - PRIMATES**

Newborn apes have a powerful grasp reflex, due to quadrupedal gait.

They are "carry feeders" And they feed "continuously"
MAMMALIAN FEEDING FREQUENCY AND MILK PROTEIN FAT CONTENT

CARRY - e.g. baboon
NEST - e.g. dog
FOLLOW - e.g. goat

Time interval between feeds 12 hours
Approximate protein and fat concentration
2 g/l

Cows milk has another problem – it is a static food

HUMAN MILK - A DYNAMIC FOOD

The composition of human milk varies immensely:
1. during the course of suckling
2. from one suckling to another suckling in a day
3. from one day to another day
4. during the whole course of lactation
5. between one mother-infant dyad to another.

Breastfeeding & Immaturity

Birth: lots of whey extra immune chemicals
NPN is constant, various content
Casein not needed for the immature newborn, has the bioactive peptides needed from mom

Nitrogen in milk in postpartum days

Birth: lots of whey extra immune chemicals
NPN is constant, various content
Casein not needed for the immature newborn, has the bioactive peptides needed from mom

Data from: http://www.meadowcreekdairy.com

Formula is cows milk designed for a calf with 4 stomachs that will go on to eat grass

http://www.meadowcreekdairy.com
**SCHEMA OF HUMAN MILK NITROGEN CONTENT**

- **WHEY**
  - 90 - 60%
  - Immunoglobulins
  - Enzymes
  - milk fat
  - Immunostimulants
  - Immunosuppressives
  - CASEIN ➔ Bioactive peptides

- **CASEIN**
  - 25%
  - Urea
  - Taurine
  - Glutamine
  - Nucleotides
  - Oligosaccharides

**Nutrition & Protection**

- **HUMAN**
  - 75%
  - WHEY ➔ Immunoglobulins
  - Enzymes
  - milk fat globules
  - Immunostimulants
  - Immunosuppressives
  - CASEIN ➔ Bioactive peptides
  - Urea
  - Taurine
  - Glutamine
  - Nucleotides
  - Oligosaccharides
  - designed for a rumen gut
toxic to the immature gut

- **COW**
  - 25%
  - WHEY ➔ Immunoglobulins
  - Enzymes
  - milk fat globules
  - Immunostimulants
  - Immunosuppressives
  - CASEIN ➔ Bioactive peptides

**Protein in human and cow milk**

- **HUMAN MILK**
  - 87%
  - Whey
  - 8%
  - Casein
  - 25%
  - NPN

- **COW’S MILK**
  - 87%
  - Whey
  - 8%
  - Casein
  - 25%
  - NPN

**CASEINS ➔ BIOACTIVE PEPTIDES**

- **unique and essential effects:**
  - Phosphopeptides ➔ absorbing calcium and zinc
  - Opioid peptides ➔ regulate gastric and intestinal motility
  - Milk mucins ➔ against all pathogenic bacteria
  - Glycoproteins ➔ against specific bacteria
  - Secretory IgA ➔ prevent necrotising enterocolitis
  - Lactoferrin ➔ growth factor, iron absorption anti-inflammatory factor
  - Cells adhesion molecules ➔ improve cellular immunity
  - Oligosaccharides ➔ bacteria-specific interactions anti-inflammatory effects

**NON - PROTEIN NITROGEN**

- **Urea** ➔ conditionally essential nutrient
- **Taurine** ➔ aminoacid required neonatal brain, eyes, kidney
- **Glutamine** ➔ for stress and sepsis
- **Nucleotides** ➔ repair of injury, specially gut immunological processes improve cellular immunity
- **Oligosaccharides** ➔ bacteria-specific interactions anti-inflammatory effects

**In cows this is** 2 - 4%.
**In humans** 20 - 25%

This is a critical component for the baby!! Over 200 irreplaceable chemicals ...
a kind of invisible hothouse

BREAST - FEEDING = BRAIN - WIRING

a kind of invisible hothouse

BREAST - FEEDING = BRAIN-WIRING 90% NUTRITION 10%

a kind of invisible hothouse

BREAST - MILK = PROTECTION

a kind of invisible hothouse

BREAST - MILK = PROTECTION 90% NUTRITION 10%

Be sure the wet nurse has plenty of milk... because if she lacks it she may give the baby milk of a goat or sheep or some other animal, because the child... nourished on animal milk does not have perfect wits like one fed on woman's milk and always looks stupid and vacant and not right in the head.

14th century Tuscan text
Human Milk Banking Association of North America
• Setting the Standards for Human Milk Banking
• Meeting the Milk Banking Needs for North America
• A Safe Alternative in the Absence of Infant’s Own Mother’s

This website is designed to provide information on milk banking and how to contact a milk bank to donate milk or to order donor human milk. This site is also a resource for health care providers and others who are looking for information on HMBANA’s resources and services.

http://www.hmbana.org/

Even a tiny amount of the first milk colostrum is vital for protecting the baby’s stomach

Small feeds often (every 60-90 mins) Bottle gets too much too fast ➔ reflux/colic?

BOTTLE VS BREASTFEEDING IN PREMATURE
Baby struggles to breathe and suck from bottle at same time

Zangen S et al
Rapid maturation of gastric relaxation in newborns

Pressures (mmHg)
Balloon inflates to
15 ml no increase
20 ml pressure OK
25 ml discomfort
30 ml ethical limit
The **CAPACITY** of a week old baby's stomach is **approx 20 ml. (1TBS!)**

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**Mammalian Feeding Frequency and Milk Protein Fat Content**

- **CARRY** - e.g. baboon
- **NEST** - e.g. dog
- **FOLLOW** - e.g. goat

<table>
<thead>
<tr>
<th>Protein Concentration</th>
<th>Time Interval between Feeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 g/l</td>
<td>12 hours</td>
</tr>
<tr>
<td>1 g/l</td>
<td>12 hours</td>
</tr>
<tr>
<td>0 g/l</td>
<td>12 hours</td>
</tr>
</tbody>
</table>

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**Care Pattern & Milk Protein**

- High protein: FOLLOW - e.g. goat
- Low protein: CARRY - e.g. monkey
- Human: HUMAN - approx 1 g/l

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**Your Baby's Brain: the latest neuroscience**

3. What HELPS your baby's brain

- The role of the sensory environment
- Breastfeeding, breast milk and the IQ debate

**QUESTIONS ?? (evaluation !!)**

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**What does my baby’s basic biology need?**

MUM!! 😊 and Dad!!

- **Skin-to-skin contact** → SAFE → growth for brain-wiring
- **Sleep** - completing brain circuits
- **Breastmilk**
  - Small feeds often (every 60-90 mins)
  - Bottle gets too much too fast → reflux/colic?
- **Bonding and attachment**
  - No separation,
  - no prolonged crying

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The latest neuroscience: breast milk and the role of vision and hearing in baby's brain.