Building Core Health

Dr Suzanne Humphries

2026

2014 Four part series on infant immunity



https://odysee.com/$/playlist/3f539b497f38eea5a8d9f5cd65f8415c13e00480

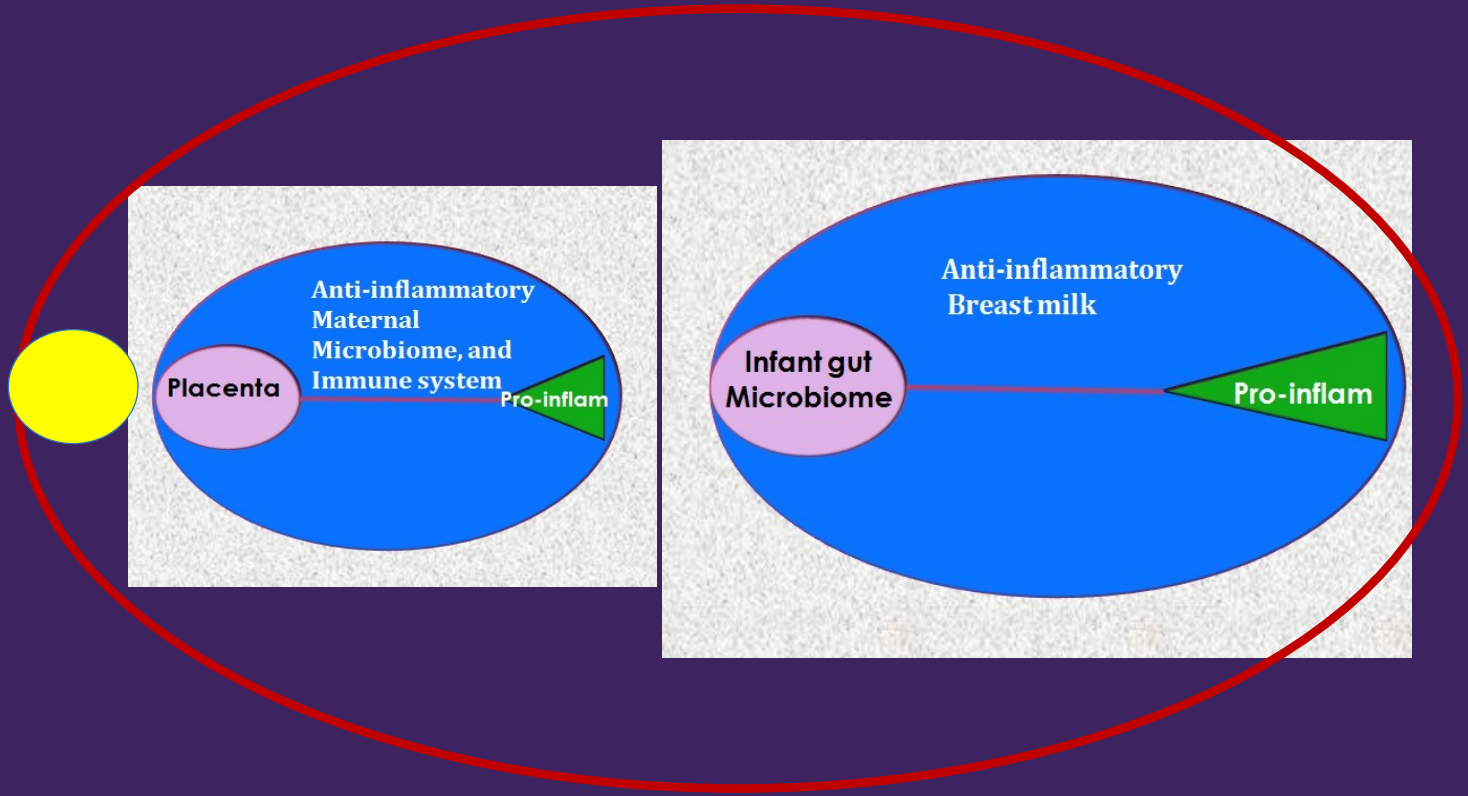
Foundations and early stages.



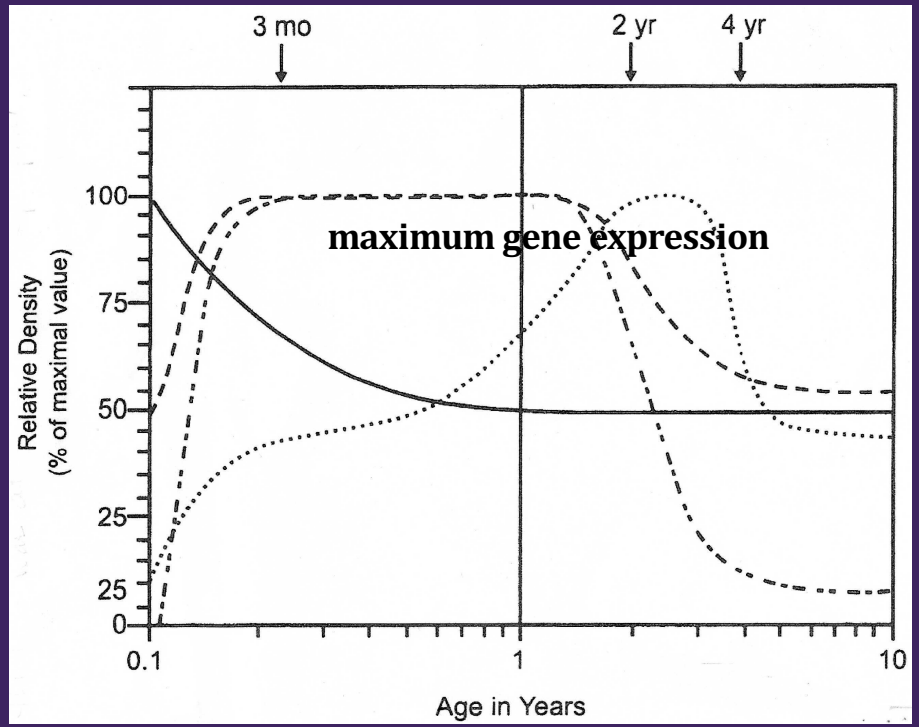


Lets look at what it takes to cultivate a healthy robust, non-vaccinated two year old….

Core foundation: Three year "pregnancy"



Developmental periods in brain



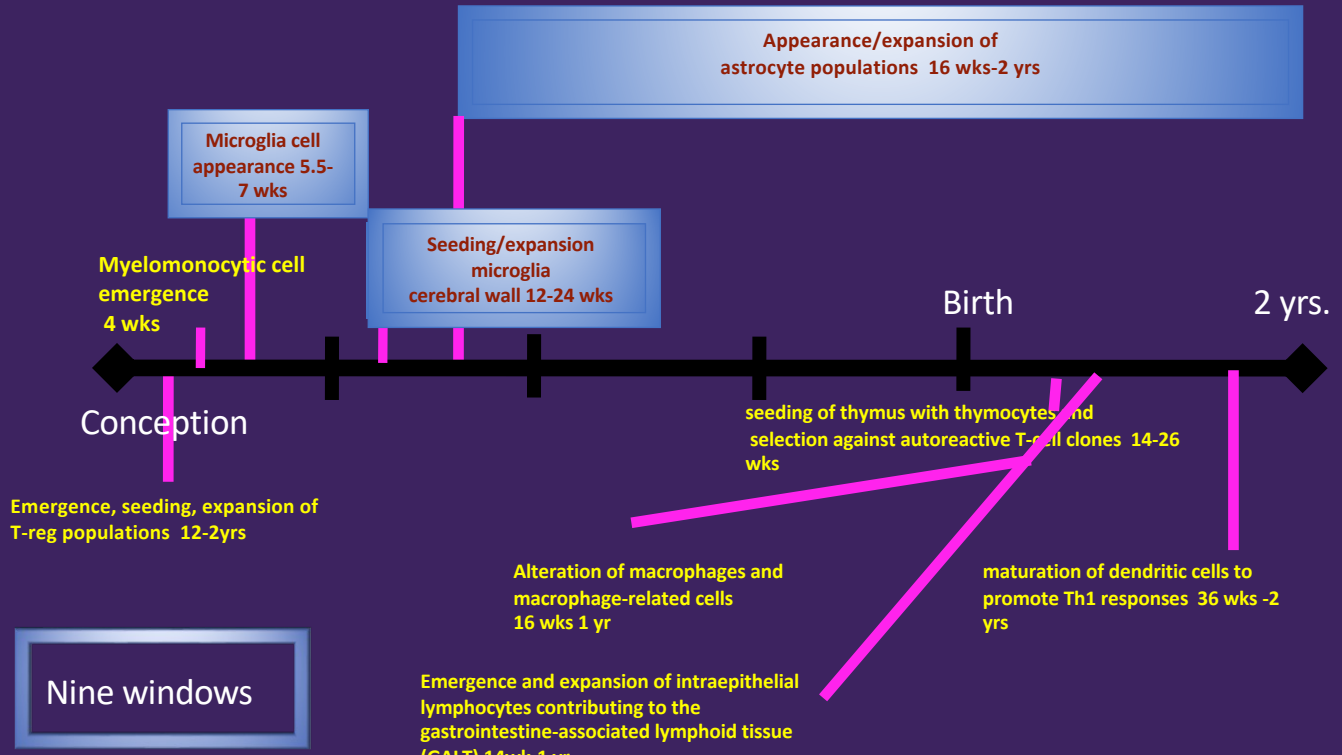
———cholecystokinin-positive neurons (satiety)

spine density/pyramidal neurons. (ability to think)

– – – –
●——●——● chandelier neuron cartridges. (nerve excitation/muscle tone)

••••••••• dopamine axon terminals. (motivational/reward related)

Developmental windows of immune maturation



Dietert 2008: PMID 18821424

From Womb to World: Exploring the Immunological Connections between Mother and Child

Cherayil 2024
PMID: 39172025

- *"…any event that impacts maternal immunity can have an influence on pregnancy itself as well as on the developing fetal immune system"*
- *"Mother and offspring constitute a single interconnected unit during pregnancy and for about 1 year after birth."*

From Womb to World: Exploring the Immunological Connections between Mother and Child

Cherayil 2024
PMID: 39172025

- *“… the microbiota has profound effects on the development, phenotype and function of multiple immune cell populations…..*
- *Variations in the mother’s microbiota can have a significant impact on the offspring’s immune capabilities.”*

From Womb to World: Exploring the Immunological Connections between Mother and Child

Cherayil 2024
PMID: 39172025

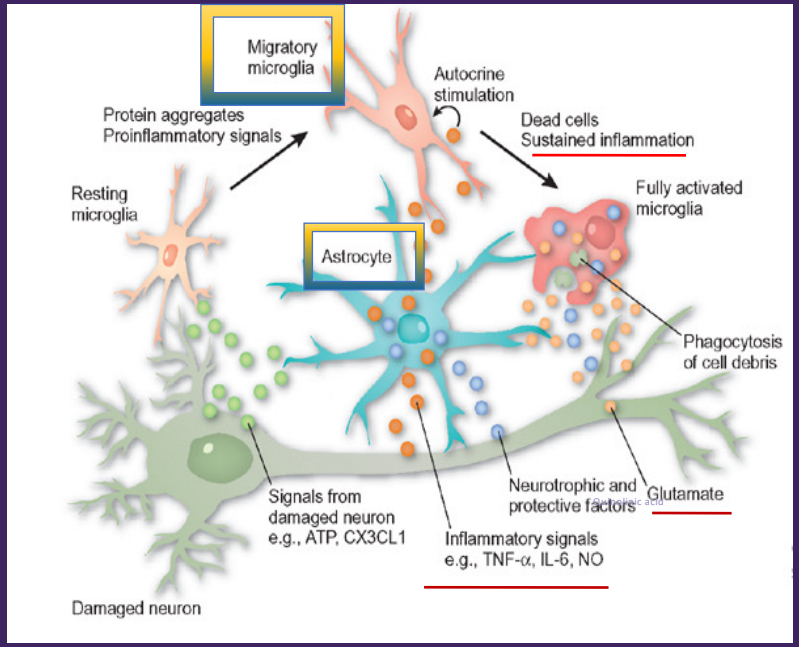
- Antibiotics in pregnancy can:
  - affect the offspring's immune capabilities or risk of infection and immune mediated disease
  - … elevated risk of infection related hospitalization .
  - Risk increases with number of antibiotics used…
  - increased risk of asthma and atopic dermatitis

From Womb to World: Exploring the Immunological Connections between Mother and Child

Cherayil 2024
PMID: 39172025

- Effect of maternal immune activation of multiple cytokines on fetus is unknown.
- Nonspecific effects of pregnancy vaccines unknown.
- Consequences of maternal innate immune activation on offspring immunity "**remains unexplored**"

Cytokines and the brain



Cytokines play important roles **in refinement of connections in the developing brain.**

~ Garay 2010. PMID: 21423522

"Microglia can be triggered into a permanently primed or sensitized state by early infection or stress."

Patterson 2009. PMID: 19136031

Known Microglial triggers

- **Vaccination stimulation**
- **Vaccine components**
  - **Aluminum**
  - **DNA/RNA/Protein frag**
  - **Mercury**
  - **MSG**
- **Gut infections/imbalance inflammation.**

Blaylock 2009. PMID: 19149568

The cycle of life….

- **Microbiome**
- Pregnancy/birth/breastfeeding
- (Stem Cells) present every stage

- Infant / Toddler
- Adolescent/child bearing age
- Elderly

European study

Molecular Fingerprinting of the Fecal Microbiota of Children Raised According to Different Lifestyles▽†

Dicksved 2007
PMID: 17293501

In this population-based study, 90 children from three European countries were examined to determine the impact of lifestyle on the fecal microbiota. The study was designed to assess the impact of two extreme lifestyles that we hypothesized could impact the microbial composition in the gut: i.e., an anthroposophic lifestyle (restricted use of antibiotics, greater consumption of fermented vegetables, etc.) versus living on a farm (greater consumption of farm milk, contact with animals, etc.). In previous studies, these lifestyles correlated with lower prevalence of allergies. Terminal restriction fragment length polymorphism (T-RFLP) was used to assess the bacterial composition in fecal samples since recent studies have shown that the majority of this community cannot be cultivated. The T-RFLP data were used to calculate richness and evenness of the fecal microbiota. Children that were attending Steiner schools (anthroposophic children) had a significantly higher diversity of microbes in their feces than farm children, who in turn also had lower diversity than the control groups. Specific primers were also used to focus on the *Lactobacillus*-like community (lactic acid bacteria [LAB]). Large differences were found in the LAB subpopulations in the sampled groups. In some children, the LAB subpopulation was dominated by a species that has not yet been cultivated.

Molecular Fingerprinting of the Fecal Microbiota of Children Raised According to Different Lifestyles▽†

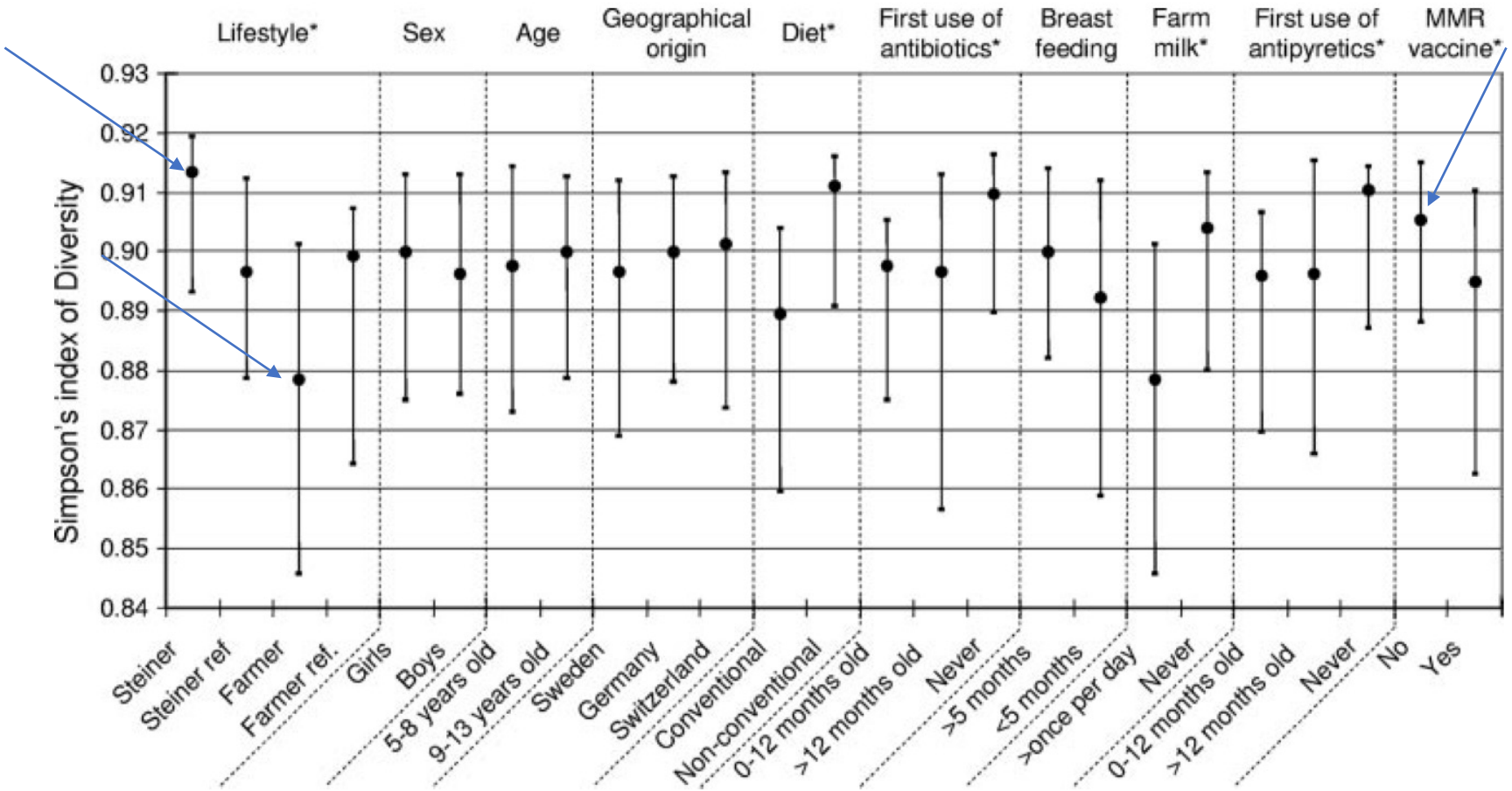
Dicksved 2007
PMID: 17293501

material). Farm children more frequently reported contact with pets and farm animals, and they consumed more home-grown or farm-produced foods compared to children in other groups. Steiner schoolchildren were breastfed for a longer period and consumed organically and/or biodynamically grown food products, as well as fermented vegetables, more often. They also received antibiotics, antipyretics, and MMR (measles, mumps, rubella) vaccinations to a lesser extent than the farm and reference children but were consequently also affected by measles infections more often.

Molecular Fingerprinting of the Fecal Microbiota of Children Raised According to Different Lifestyles▽†

Dicksved 2007
PMID: 17293501

parison between samples. When the different groups of children were compared with regard to the diversity of their fecal bacteria, some highly significant differences were observed. Foremost, Steiner schoolchildren had a higher diversity of fecal bacteria compared to farm children ($P = 0.0001$; Fig. 2), as exhibited by a larger number of total TRFs and higher evenness than those of the farm children, (average TRF numbers


Lifestyle*
Sex
Age
Geographical origin
Diet*
First use of antibiotics*
Breast feeding
Farm milk*
First use of antipyretics*
MMR vaccine*
Simpson's index of Diversity
0.93
0.92
0.91
0.90
0.89
0.88
0.87
0.86
0.85
0.84
Steiner
Steiner ref
Farmer
Farmer ref.
Girls
Boys
5-8 years old
9-13 years old
Sweden
Germany
Switzerland
Conventional
Non-conventional
0-12 months old
>12 months old
Never
>5 months
<5 months
>once per day
Never
0-12 months old
>12 months old
Never
No
Yes

Molecular Fingerprinting of the Fecal Microbiota of Children Raised According to Different Lifestyles[▽†]

Dicksved 2007
PMID: 17293501

($P = 0.007$; Fig. 2). In addition, children who had never used antibiotics or antipyretics had a significantly higher diversity of bacteria than those who had used antibiotics ($P = 0.024$; Fig. 2) or antipyretics ($P = 0.031$; Fig. 2) during the first year of life. Children who had received MMR vaccinations showed lower diversity than those who had not received MMR vaccination

Go With Your Gut: The Shaping of T-Cell Response by Gut Microbiota in Allergic Asthma

Di Gangi 2020 PMID: 32760404

T CELL PLASTICITY AND GUT MICROBIOTA

During homeostatic periods, gut-microbiota and T-cells within the gut mucosa engaged profitable crosstalk capable of shaping the systemic immune response of the individual. T-cell-receptors are reactive to microbiota-derived antigens that are necessary for an adequate maturation of the immune system and to ensure proper colonization of the gut lumen. Heterogeneous

Go With Your Gut: The Shaping of T-Cell Response by Gut Microbiota in Allergic Asthma

Di Gangi 2020 PMID: 32760404

helper (Th) 2 responses, a complex network of immunological interaction driven by gut microbiota could modulate the final effector phase. Regulatory T cells are abundant in gastrointestinal mucosa and have been shown to be pivotal in AAS. The gut microbiota could also influence the activity of other T cell subsets such as Th9, Th17, and populations of effector/memory T lymphocytes. Furthermore, gut microbiota metabolites drive the hematopoietic pattern of dendritic cells and ameliorate lung Th2 immunity in AAS models. The administration of probiotics has shown conflicting results in AAS,

Go With Your Gut: The Shaping of T-Cell Response by Gut Microbiota in Allergic Asthma

Di Gangi 2020 PMID: 32760404

are noted in germ-free mice, and the degree of systemic immune perturbance of a single macrolide pulse is relatively modest, but it is strong enough to induce an imbalance in local Th17 immunity, leading to long-lasting microbiome alterations (23). It would be of great interest to explore T-cell development in a similar model challenged with HDM or OVA.

Since transient gut dysbiosis is relatively common in children due to the widespread use of antibiotics (24), it is possible

Review

The Neonatal Immune System and Respiratory Pathogens

Colleen J. Sedney and Eric T. Harvill *

Sedney 2023 PMID: 37375099

- *"We have previously promoted the view of the mammalian immune system as a form of microbiome management. . . .*
- *Neonate must rapidly and efficiently determine the benefits and risks of reaction to many of each [microbe/pathogen] nearly simultaneously."*

Review

The Neonatal Immune System and Respiratory Pathogens

Colleen J. Sedney and Eric T. Harvill *

Sedney 2023 PMID: 37375099

- *"We propose a view of neonatal immunity as not a flawed version of adult immunity, but as a system evolved to face this particular challenge, very different from that of an adult."*
- *"…viewing the neonatal immune system as an incomplete version of the adult's* ***is missing its critical and unique challenges****. The most immediate challenge is the exit from the near-sterile uterus, which represents a unique transition which suddenly bombards the immune system with huge numbers* ***and a diversity of microbes, each expressing thousands of antigens and many of which immediately begin to establish permanent residence in intimate contact with all body surfaces****."*

Review

The Neonatal Immune System and Respiratory Pathogens

Colleen J. Sedney and Eric T. Harvill *

Sedney 2023 PMID: 37375099

- *The emerging view is that neonates have a distinctly different immune response that is well-adapted to deal with unique immunological challenges of the transition from a relatively sterile uterus to a microbe-rich world, tending to suppress potentially dangerous inflammatory responses.*
- *increasing evidence suggests that newborns and neonates have a quite effective immune system that is very different from that of adults…*

Review

The Neonatal Immune System and Respiratory Pathogens

Colleen J. Sedney and Eric T. Harvill *

Sedney 2023 PMID: 37375099

Therefore, during this transition from near-sterile fetal to microbe-rich neonatal environment, ***the immune system is evolved to respond to novel antigens primarily with anti-inflammatory TH2 responses to prevent unnecessary inflammation*** *which can severely harm the infant.*

How does the infant defend itself?

- The mother is key while baby's B cells are maturing.
- Baby is not making IgG and IgA robustly.
- Maternal IgG is transferred across the placenta and secretory IgA plus other factors in breast milk this contributes to antibody-mediated defense against some extracellular bacteria and toxins.

Review

The Neonatal Immune System and Respiratory Pathogens

Colleen J. Sedney and Eric T. Harvill *

Sedney 2023 PMID: 37375099

Pertussis vaccines in adults do not prevent asymptomatic nasal carriage and transmission, and therefore, infants are often infected by asymptomatic caregivers. . . In addition to imperfect vaccines, antibiotic treatments have limited effect after the presentation of diagnostic symptoms. Therefore, more information on the effects of B. pertussis on the neonatal immune system is required to develop the most appropriate treatments and vaccines.

Drugs: What could possibly go wrong?



From Womb to World: Exploring the Immunological Connections between Mother and Child

Cherayil 2024
PMID: 39172025

- Tdap vaccines do not fully protect the mother
  - Decreases newborn's own immune response to subsequent pertussis vaccination as well as polio and pneumococcus vaccine. ("Blunting")
- *Impact on maternal microbiome and acquisition of maternal micro-chimeric cells* ***"entirely unknown"***

How they arise and persist

During pregnancy, cells (and also extracellular vesicles) traffic across the placenta in both directions. Maternal cells that enter the fetus are present at very low frequency—typically far less than 1% of cells, often on the order of 1 in a million. They include immune cells (T cells, B cells, NK cells, monocytes/macrophages, granulocytes) as well as stem or progenitor cells that can differentiate into tissue-specific cell types. pmc.ncbi.nlm.nih.gov

These cells have been detected in many organs of the offspring, including bone marrow, thymus, spleen, lymph nodes, liver, lungs, heart, pancreas, kidney, adrenal gland, gonads, and even the brain. They can remain detectable into adulthood. pmc.ncbi.nlm.nih.gov

Biological roles

Research (mostly in mice, with supporting human data) indicates they are not just leftover “souvenirs”:

- They help shape the offspring’s immune system, including promoting differentiation of certain immune cells and enhancing early-life resistance to some infections. nature.com
- A specific subset (LysM^{+} CD11c^{+} maternal cells) sustains long-term immunological tolerance to *non-inherited maternal antigens* (NIMAs)—the mother’s antigens the child did not inherit genetically. This tolerance can influence later pregnancy outcomes in the next generation. cell.com
- Stem-like maternal cells may contribute to tissue integration or repair in some contexts.

Rapid microbiome restructuring associated with medical exposure in remote Amazonian Indigenous communities

Sun 2026 PMID: 42167245

- Bolivar State, Caura River basin
- Yek'wana andYanomami-Senema people
- 6 very remote villages, no previous medical contact
- 1 less remote village, quarterly visits, antibiotics, antifungals, antiparasitic drugs, analgesics and vaccines.

Rapid microbiome restructuring associated with medical exposure in remote Amazonian Indigenous communities

Sun 2026 PMID: 42167245

- Remote villages : *"To our knowledge, no additional organized groups visited these remote communities between sampling points, and interactions with visitors were brief and centered on medical activities, without food distribution.*
- **No non-local food sources were brought in** or distributed during medical campaigns, and subsistence practices based on hunting, fishing, gathering, and household gardening remained unchanged.
- No additional organized groups visited the remote villages between sampling points."

Rapid microbiome restructuring associated with medical exposure in remote Amazonian Indigenous communities

Sun 2026 PMID: 42167245

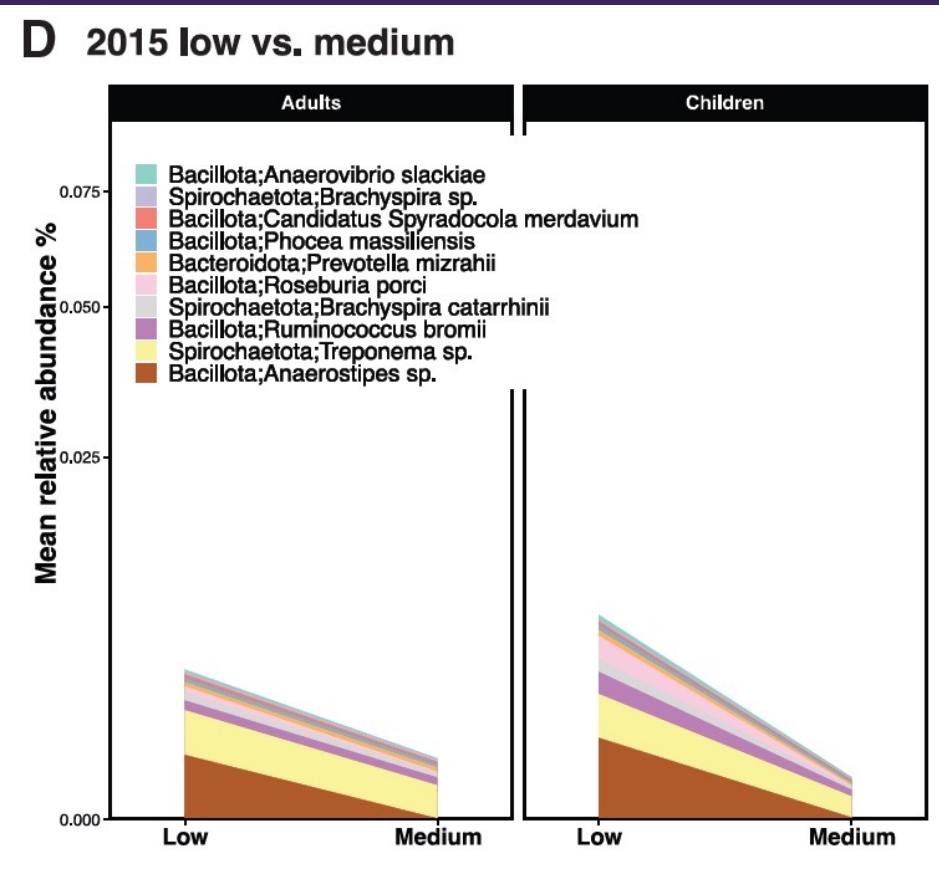
- Sampling: October 2015, February 2016
- 1,506 samples: 200 children 75 adults,
- 97 samples from same individuals both time points
- Fecal, oral, nasal and skin swabs for DNA extraction for metagenomics sequencing

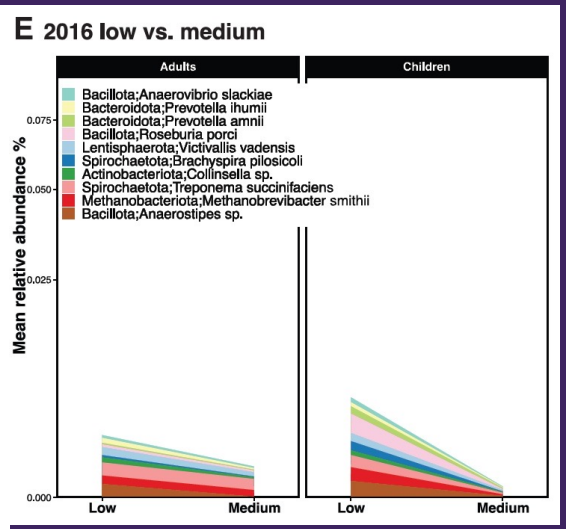
Rapid microbiome restructuring associated with medical exposure in remote Amazonian Indigenous communities

Sun 2026 PMID: 42167245

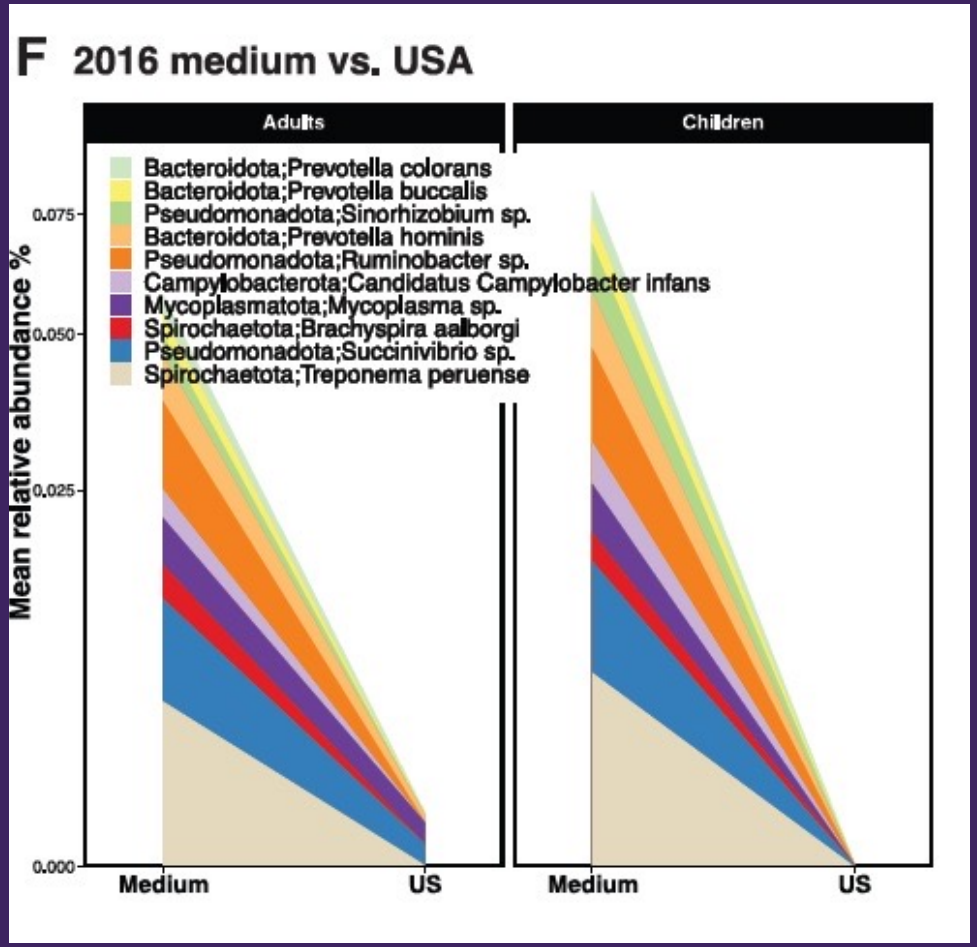
- Urban lifestyle practices characterized by strong antimicrobial measures, disrupt the transmission and colonization of human-coevolved microbe within the microbiota. **This interference affects developmental programming**
- “This natural experiment, … provides a unique and early view of microbiome transitions that are **typically obscured by many confounded elements of industrialization**.”

Sun 2026 PMID: 42167245



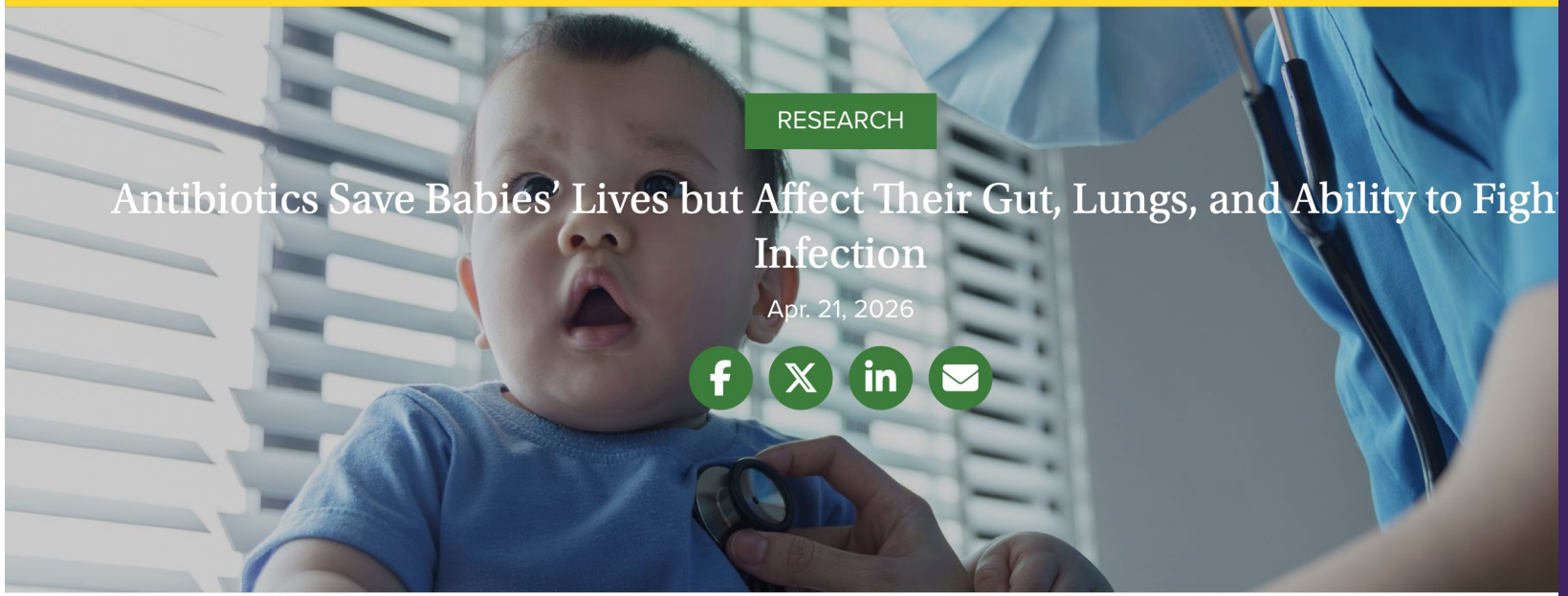


Sun 2026 PMID: 42167245



Not just the Amazon, but for us too.

- Disruption of microbiome affects developmental programming. Cheryall 2024 from part I
- Influences gene expression
- Contributes to immune, metabolic, neurodevelopmental diseases, Ab resistance
- Heightened risk of chronic immune-metabolic diseases.



RESEARCH

Antibiotics Save Babies' Lives but Affect Their Gut, Lungs, and Ability to Fight Infection

Apr. 21, 2026

Study shows changes have a long-term impact on lung immune cells

- A new study found early antibiotic exposure, while essential for saving newborns' lives, changes babies’ gut microbiome.
- This disruption "travels" from the gut to the lungs and rewires the immune system by altering how the lungs' immune cells function.
- These immune cell changes didn’t fade with time, persisting into young adulthood in mice.
- The research suggests a need to develop strategies to protect a baby's immune system during necessary antibiotic treatment.
- My question: what other body function are affected and still NOT studied?

Mucosal Immunology 19 (2026) 1835–1847

Contents lists available at ScienceDirect

Mucosal Immunology

journal homepage: www.elsevier.com/mi



Article

Single cell atlas of lung-resident innate lymphoid cells shows impact of age and dysbiosis on epigenetic and transcriptomic programming

Bonfield 2026
PMID: 41554380

Madeline Bonfield [a,b,c,d], Jerilyn Gray [b,c], Alicia Ramiriqui [b,c], Joseph Stevens [a,b,c,d,e], Uday Pandey [n], Laura Canaday [d,f], H.Alex Feldman [d,e,f], William J Zacharias [a,c,d,e,g,h], Leah Kottyan [a,d,e,f,i], Stephen N. Waggoner [a,d,e,f,j], Hitesh Deshmukh [a,b,c,d,e,k,l,*], Shelby Steinmeyer [m]

- (ILC) development and function in the neonatal lung **remain incompletely defined**. ILCs are critical mediators of early-life innate immune responses in the lung
- mechanisms that drive ILC development and function, especially in the neonatal lung, **remain an area of active research**
- **knowledge gaps i**n the effects of early-life dysbiosis on pulmonary ILCs.

So where do we start?

Stay away from the conventional medical profession unless absolutely necessary.



Covid jab

- If a pregnant mother is injected, what happens?



Sars-cov-2 mRNA vaccines

mRNA-1273 is placenta-permeable and immunogenic in the fetus

Chen 2025
PMID: 40104112

- Moderna:“ Generally recognized as safe” – yet not tested on pregnant women.
- LNP-mRNA vaccines cross placenta, into cord blood.
- LNP-mRNA cross into Breastmilk

- *Persistent mRNA in fetal tissues raises theoretical concerns about genotoxicity or integration*
- *LNP composition may influence (mRNA and anything else)transfer efficiency*
- *Clinical human data previously failed to detect transfer, likely because sampling occurred too late after the rapid clearance of circulating mRNA-LNPs.*
- *Further studies are needed on long-term safety, optimal dosing, and translation to humans*

COVID-19 Vaccine mRNA Biodistribution: Maternal and Fetal Exposure Risks

Zhong 2024 PMID: 39392236

- Pfizer – crosses placenta.
- Pfizer mRNA found in breastmilk
- Three previous trials used mismatched probes and primers.
- Biodistribution to placenta **not included in Pfizer's animal biodistribution studies** to EMA in 2020

Zhong 2024 PMID 39392236

COVID-19 Vaccine mRNA Biodistribution: Maternal and Fetal Exposure Risks

Zhong 2024 PMID: 39392236

- “our study” used correct probes and primers for vaccine sequence:
- vaccine mRNA distributes systemically to placenta, cord blood and makes spike in placenta.
- Animal studies = functional mRNA delivered to fetal liver, lung intestines.
- Animal studies = mRNA functional after being delivered to target cells in exosomes.

Zhong 2024 PMID 39392236

COVID-19 Vaccine mRNA Biodistribution: Maternal and Fetal Exposure Risks

Zhong 2024 PMID: 39392236

- the existence of multiple open reading frames overlapping sars cov-3 mRNA in the vaccine “can lead to the translation of different proteins from a single gene. … consequently the existence of these ORFS” … might result in the synthesis of unwanted proteins which “**could potentially trigger alterations in the placental transcriptome leading to possible unintended consequences**”

Zhong 2024 PMID 39392236

COVID-19 Vaccine mRNA Biodistribution: Maternal and Fetal Exposure Risks Zhong 2024 PMID: 39392236

Despite the increasing evidence supporting the safety and efficacy of COVID-19 mRNA vaccines for pregnant women and their foetuses, several limitations and knowledge gaps persist in our current understanding."

Zhong 2024 PMID 39392236

COVID-19 Vaccine mRNA Biodistribution: Maternal and Fetal Exposure Risks

Zhong 2024 PMID: 39392236

- "Our understanding of mRNA deliver during pregnancy is still developing."

  Or as another article put it, "shrouded in clouds"

Zhong 2024 PMID 39392236

COVID-19 Vaccine mRNA Biodistribution: Maternal and Fetal Exposure Risks Zhong 2024 PMID: 39392236

Although data indicates that mRNA vaccination during pregnancy is safe, it is crucial for pregnant women to engage in informed discussion with their healthcare providers regarding the benefits and potential risks associated with maternal mRNA vaccines

Zhong 2024 PMID 39392236

2020 hematopoietic progenitor stem cells

Review > Leukemia. 2020 Jul;34(7):1726-1729. doi: 10.1038/s41375-020-0887-9.
Epub 2020 Jun 1.

SARS-CoV-2 infection and overactivation of Nlrp3 inflammasome as a trigger of cytokine "storm" and risk factor for damage of hematopoietic stem cells

Mariusz Z Ratajczak [1] [2], Magda Kucia [3] [4]

Affiliations + expand

PMID: 32483300 PMCID: PMC7262681 DOI: 10.1038/s41375-020-0887-9

2021 hematopoietic stem progenitor cells

› Leukemia. 2021 Oct;35(10):3026-3029. doi: 10.1038/s41375-021-01332-z. Epub 2021 Jun 23.

An evidence that SARS-Cov-2/COVID-19 spike protein (SP) damages hematopoietic stem/progenitor cells in the mechanism of pyroptosis in Nlrp3 inflammasome-dependent manner

Magdalena Kucia [1 2], Janina Ratajczak [3], Kamila Bujko [4], Mateusz Adamiak [4], Andrzej Ciechanowicz [4], Vira Chumak [4], Katarzyna Brzezniakiewicz-Janus [5], Mariusz Z Ratajczak [6 7 8]

Affiliations + expand

PMID: 34163002 PMCID: PMC8219510 DOI: 10.1038/s41375-021-01332-z

2022 cord blood hematopoietic progenitor stem cells

Skewed fate and hematopoiesis of CD34$^+$ HSPCs in umbilical cord blood amid the COVID-19 pandemic

Estep 2022
PMID: 36406860

The limited numbers of CD34$^+$ cells in the UCB of the vaccinated donor groups were the greatest impediment, especially for the hematopoiesis differentiation assays, transcriptomics at the single cell level, as well as all statistical analyses. The use of freshly isolated MNCs for humanization following depletion of incoming T cells by anti-CD3 antibodies[67] or pre-expanding CD34$^+$ cells *ex vivo*[68,69] would be required to assess the impact of SARS-CoV-2 vaccination on UCB CD34$^+$ cells and hematopoiesis in future experiments. These studies should serve as a touchstone for understanding these potential impacts and provide insight about how the long-term side effects of SARS-CoV-2 infection and/or vaccination in mothers and even neonates affect future human immune health.

Article

Skewed fate and hematopoiesis of CD34+ HSPCs in umbilical cord blood amid the COVID-19 pandemic

Benjamin K. Estep,[1] Charles J. Kuhlmann,[1] Satoru Osuka,[4] Gajendra W. Suryavanshi,[5] Yoshiko Nagaoka-Kamata,[2] Ciearria N. Samuel,[1] Madison T. Blucas,[1] Chloe E. Jepson,[1] Paul A. Goepfert,[3] and Masakazu Kamata[1,6,*]

Estep 2022
PMID: 36406860

SUMMARY

Umbilical cord blood (UCB) is an irreplaceable source for hematopoietic stem progenitor cells (HSPCs). However, the effects of SARS-CoV-2 infection and COVID-19 vaccination on UCB phenotype, specifically the HSPCs therein, are currently unknown. We thus evaluated any effects of SARS-CoV-2 infection and/or COVID-19 vaccination from the mother on the fate and functionalities of HSPCs in the UCB. The numbers and frequencies of HSPCs in the UCB decreased significantly in donors with previous SARS-CoV-2 infection and more so with COVID-19 vaccination via the induction of apoptosis, likely mediated by IFN-γ-dependent pathways. Two independent hematopoiesis assays, a colony forming unit assay and a mouse humanization assay, revealed skewed hematopoiesis of HSPCs obtained from donors delivered from mothers with SARS-CoV-2 infection history. These results indicate that SARS-CoV-2 infection and COVID-19 vaccination impair the functionalities and survivability of HSPCs in the UCB, which would make unprecedented concerns on the future of HSPC-based therapies.

Skewed fate and hematopoiesis of CD34$^+$ HSPCs in umbilical cord blood amid the COVID-19 pandemic

Estep 2022
PMID: 36406860

infection and/or vaccination on the fate and hematopoietic abilities of CD34$^+$ cells in the UCB thereof. Reduced CD34$^+$ cell frequencies and thus lower CD34$^+$ cell numbers were observed in the UCB from the non-vaccinated but previously infected donor group and even more so in the vaccinated donor group, which was attributed to the induction of apoptosis. Furthermore, these reductions in CD34$^+$ cell numbers and frequencies correlated with the timing of the second-vaccination in donors the numbers and frequencies inversely correlated with the period after the vaccination until delivery, indicating that factors causing these damages are maintained over the gestation period. In addition, the CD34$^+$ cells, which would be residual cells following apoptosis, showed skewed hematopoiesis profiles, indicating that previous SARS-CoV-2 infection, and likely vaccination based on the observed trends, interferes not only with the fate of CD34$^+$ cells but also the hematopoietic abilities, phenotype, and survivability of populations thereof, which could result in a shortage of available CD34$^+$ HSPCs from cord blood banking, processing for use toward HSPC-based therapies, as well as unpredictable hematological issues in HSPC recipients.

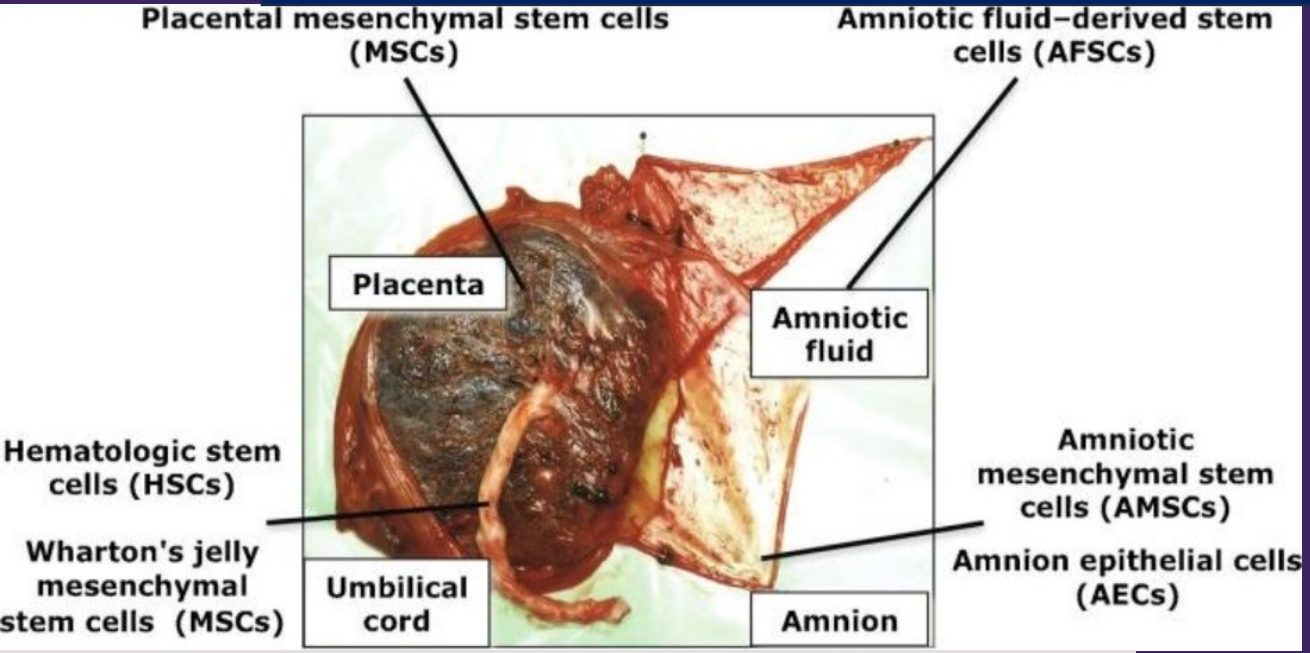
To assess the recovery time needed for decreased $CD34^+$ cell numbers of donors following the vaccination/infection to baseline as established by the negative donor group, the % frequencies and numbers of $CD34^+$ cells per 1 mL of UCB against the days post-second vaccination were plotted (Figures 1C and 1D). Both parameters were inversely correlated with the term following the vaccination, though there was no significance difference by the positivity for IgGs against SARS-CoV-2 S and N proteins, indicating that these impacts on $CD34^+$ cells were largely caused by the vaccination, in which the trends continued without recovering to baseline over the entire gestation period.

Question

- What are the consequences for the baby of vaccinated mothers as a result of reduced numbers of hematopoietic stem cells, and damaged stem cells?

the continuous IFN-γ stimulation was present in the donor, these levels should more increase.[53,54] Importantly, IFN-γ disrupts quiescence of HSPCs and promotes excessive terminal differentiation via bone marrow stromal cell antigen 2 (BST2) that mediates HSPC delocalization and activation.[25,56] Another report also indicated negative impacts of IFN-γ on HSPCs in terms of multilineage engraftment as well as self-renewability.[57] More recently, it has also been indicated that BNT162b2 mRNA COVID-19 vaccine significantly increases the levels of IFN-γ in the vaccinated subjects more than the infected subjects.[58–62] As such, one of the potential reasons for the decrease in UCB $CD34^+$ cells obtained from the N+/S+ donor groups would be continuous stimulation of them by IFN-γ over the course of gestation locally, such as in the feral liver, bone marrow, or the fetal spleen before circulating in the UCB.[63] The decrease and the stress-induced differentiation of $CD34^+$ HSPCs observed attributes to decreased circulating peripheral lymphocytes in fetuses, resulting in lower MNC numbers in the UCB. At present, it is unknown how these damages on $CD34^+$ cells are impactful to the neonate immune system for example, for fighting other pathogenic viruses, bacterial infections, or cancerous cells, as well as for maintaining homeostatic hematopoiesis, proper humoral and cellular immunities.

Neonatal stem cells are all anti-inflammatory and immune-dampening to the young infant.



http://www.medscape.com/viewarticle/778507

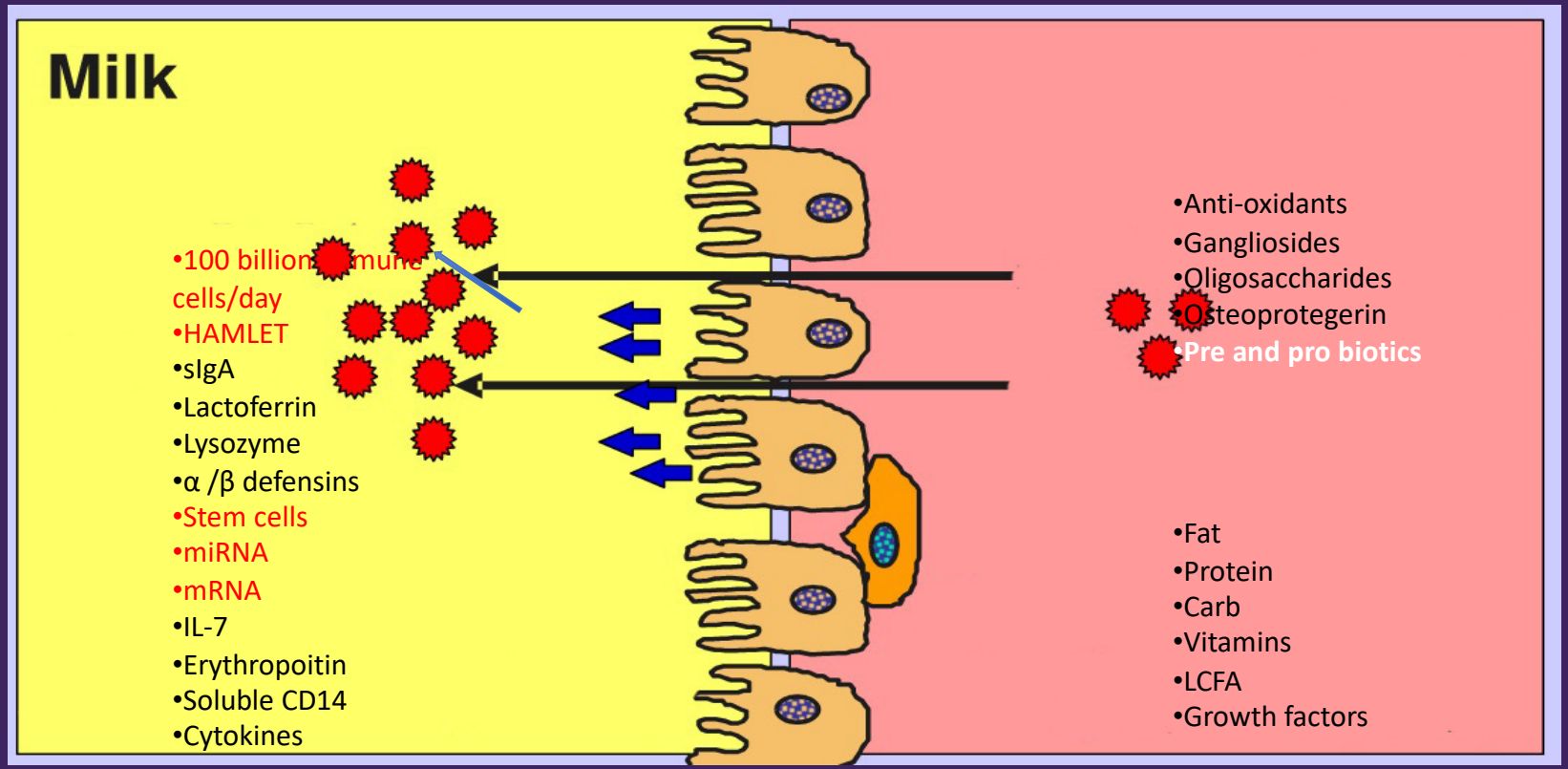
Cord blood is the baby's blood

- It is identical in every way to the baby's blood. It is separate to the mother and identical to the baby's blood. It is the baby's blood. **Don't clamp the cord…**
- 33% of the blood left in placenta and cord was meant for the baby. Not giving it, deprives baby of 33% of it's blood. Like a hemorrhage
- Akin to 1.6 l iters loss in a 70kg person, which is a major hemorrhage. 40% is considered life threatening.
- Let's also think about this in terms of CD34+ stem cells.

Consequences of stem cell deletion?

- Stem cells orchestrate organ development. Covid shots increase miscarriage rate. Even Fauci admitted it.
- Immune system cell damage
  - What are consequences of giving all these vaccines in pregnancy? If fetus incurred stem cell deletion from a covid jab to mother.
- Unviable fetus, immune delays/damage CD34 (Estep), the future?
  - CD34 is a well-established surface marker for immature hematopoietic stem cells (HSCs) and progenitors in humans. These cells generate all mature blood lineages (erythroid, myeloid, lymphoid, megakaryocytic) needed for oxygen transport, immunity, hemostasis, and overall fetal growth.

From Blood to Milk



Review

Biodistribution of RNA Vaccines and of Their Products: Evidence from Human and Animal Studies

Pateev 2024
PMID: 38255166

BNT162b2 or mRNA 1273	Healthy lactating individuals (first/second dose)	Humans	+ breast milk (up to 48 h after vaccination, only in ~50% of subjects)	[45,46]
BNT162b2 or mRNA 1273	Healthy lactating individuals (first/second dose)	Humans	– breast milk	[47]
BNT162b2	Healthy lactating individuals (first/second dose)	Humans	+ breast milk (up to 3 days after vaccination, only in ~10% of subjects)	[48]

the tested samples was 2 ng/mL within 1–3 days after the vaccination. Thus, vaccine RNA is indeed capable of crossing the blood–breast milk barrier, but the amounts of detected RNA are low and are eliminated several days after vaccination. These results highlight the need for additional research to better understand this process and its clinical relevance.

Biodistribution of RNA Vaccines and of Their Products: Evidence from Human and Animal Studies

Pateev 2024
PMID: 38255166

was found in breast milk but no later than 48 h after the vaccination. The concentration of vaccine mRNA among the women varied from 1.3 to 16.78 pg/μL after normalization to starting breast milk volume (mL). It is worth mentioning that in a later work, the same authors quantified vaccine mRNA in the same samples but by a more accurate method: droplet digital PCR [46]. The concentration of vaccine mRNA varied between 1544 and 7605 copies/mL. After 48 h, vaccine mRNA in breast milk was not detectable either, confirming the previous findings. Despite the similarity of the results obtained in the first and

Skewed immune system?

Potential outcomes apply to all vaccines.

- Mother gets vaccinated. Fetus is affected too.
- Mother’s milk is affected.
- Child has changed immune system (germinal centers have changed) which does not revert to normal

Vono 2019 germinal centers altered

Article

Cell Reports

Maternal Antibodies Inhibit Neonatal and Infant Responses to Vaccination by Shaping the Early-Life B Cell Repertoire within Germinal Centers

Dysregulated germinal center (GC) activity in this paper means loss of proper control over the GC response by follicular regulatory T (T_{FR}) cells, leading to expanded, poorly suppressed GCs that produce excessive and sometimes autoreactive antibodies.

Von et al. direct quote

“Beyond their academic interest, these observations have clinical consequences. First, they indicate that clinical trials comparing vaccine responses in infants of immunized or naturally exposed versus non-immunized naive mothers should not only assess the short-term effect but also the long-term influence of MatAbs; the influence on MBC generation and the potential shift of infant B cell responses from immunodominant o non-immunodominant epitopes are still unknown. Next, they prompt for the evaluation of immunization strategies maximizing the protective efficacy of maternal immunization while minimizing their inhibitory influence on infant B cell responses.”

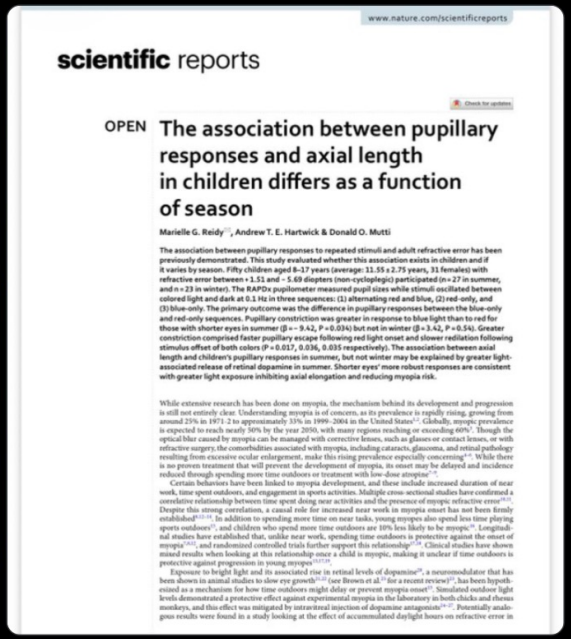
Keeping healthy

- Avoid vaccines in pregnancy and infancy
- Natural birth
- Human milk to 2 years
- Whole food balanced diet low in carbs
- Sunshine on body
- Understand fever
- No sunglasses
- Knowing the infections and relevant treatments.
- Knowing when you need help. Find a TRUSTED medical provider
- Grounding
- Avoid blue light
- Avoid EMF

Why?

Because typical indoor lighting is orders of magnitude dimmer than
Show more





www.nature.com/scientificreports

scientific reports

OPEN

The association between pupillary responses and axial length in children differs as a function of season

Marielle G. Reidy, Andrew T. E. Hartwick & Donald O. Mutti

The association between pupillary responses to repeated stimuli and adult refractive error has been previously demonstrated. This study evaluated whether this association exists in children and if it varies by season. Fifty children aged 8–17 years (average: 11.55 ± 2.75 years, 31 females) with refractive error between +1.51 and − 5.69 diopters (non-cycloplegic) participated (n = 27 in summer, and n = 23 in winter). The RAPDx pupilometer measured pupil sizes while stimuli oscillated between colored light and dark at 0.1 Hz in three sequences: (1) alternating red and blue, (2) red-only, and (3) blue-only. The primary outcome was the difference in pupillary responses between the blue-only and red-only sequences. Pupillary constriction was greater in response to blue light than to red for those with shorter eyes in summer (β = − 9.42, P = 0.034) but not in winter (β = 3.42, P = 0.54). Greater constriction comprised faster pupillary escape following red light onset and slower redilation following stimulus offset of both colors (P = 0.017, 0.036, 0.035 respectively). The association between axial length and children's pupillary responses in summer, but not winter may be explained by greater light-associated release of retinal dopamine in summer. Shorter eyes' more robust responses are consistent with greater light exposure inhibiting axial elongation and reducing myopia risk.

While extensive research has been done on myopia, the mechanism behind its development and progression is still not entirely clear. Understanding myopia is of concern, as its prevalence is rapidly rising, growing from around 25% in 1971–2 to approximately 33% in 1999–2004 in the United States[1,2]. Globally, myopic prevalence is expected to reach nearly 50% by the year 2050, with many regions reaching or exceeding 60%[3]. Though the optical blur caused by myopia can be managed with corrective lenses, such as glasses or contact lenses, or with refractive surgery, the comorbidities associated with myopia, including cataracts, glaucoma, and retinal pathology resulting from excessive ocular enlargement, make this rising prevalence especially concerning[4–6]. While there is no proven treatment that will prevent the development of myopia, its onset may be delayed and incidence reduced through spending more time outdoors or treatment with low-dose atropine[7–9].

Certain behaviors have been linked to myopia development, and these include increased duration of near work, time spent outdoors, and engagement in sports activities. Multiple cross-sectional studies have confirmed a correlative relationship between time spent doing near activities and the presence of myopic refractive error[10–12]. Despite this strong correlation, a causal role for increased near work in myopia onset has not been firmly established[13,14]. In addition to spending more time on near tasks, young myopes also spend less time playing sports outdoors[15], and children who spend more time outdoors are 10% less likely to be myopic[16]. Longitudinal studies have established that, unlike near work, spending time outdoors is protective against the onset of myopia[17,18], and randomized controlled trials further support this relationship[19,20]. Clinical studies have shown mixed results when looking at this relationship once a child is myopic, making it unclear if time outdoors is protective against progression in young myopes[15,17,19].

Exposure to bright light and its associated rise in retinal levels of dopamine[21], a neuromodulator that has been shown in animal studies to slow eye growth[22–25] (see Brown et al.[26] for a recent review)[27], has been hypothesized as a mechanism for how time outdoors might delay or prevent myopia onset[27]. Simulated outdoor light levels demonstrated a protective effect against experimental myopia in the laboratory in both chicks and rhesus monkeys, and this effect was mitigated by intravitreal injection of dopamine antagonists[24–27]. Potentially analogous results were found in a study looking at the effect of accumulated daylight hours on refractive error in

---

Rusty ⚡: Solar Powered ☀️ @ze_rusty · Jul 27



Blue light induced ferroptosis in retinal damage via iron overload–associated oxidative stress

Your retina is loaded with melanin and iron.

Blue light excites both, driving reactive oxygen species like superoxide.

...

Necessary items

- Vit A for measles
  - CLO
- Vit C for just about everything
  - https://drsuzanne.net/sodium-ascorbate-vitamin-c-treatment-of-whooping-cough/
- Outdoors and in sun whenever possible (Vit D pills not the same)
- Circadian match
- Eat real food, high in healthy fat, protein, low sugar (always natural)

Keep these products in your house

- Vitamin C
  - Sodium ascorbate crystalline
  - Liposomal
- Colloidal silver 500 PPM
- Bentonite clay
- Activated charcoal
- Basic homeopathy kit
- “Dr Mom” ear scope
- Nebulizer (type that plugs into the wall, not handheld mini) if any respiratory issues
- Hydrogen peroxide food grade 3% or higher
- Red light/infrared heating pad
- May need Vitamin D or CLO (purchase when needed to keep fresh supply)
- Probiotics (lacto and bifido)

Vaccines: What could possibly go wrong?



END

Is there a fundamental key to staying healthy?



What is “normal” vitamin c?

Simply preventing scurvy is not the same as promoting optimal health.

Original Research

Vitamin C Deficiency in a University Teaching Hospital

Runye Gan, Shaun Eintracht, MD, L. John Hoffer, MD, PhD

Lady Davis Institute for Medical Research, McGill University (R.G., L.J.H.) and Department of Diagnostic Medicine (S.E.), Jewish General Hospital, Montreal, CANADA

Key words: ascorbic acid, vitamins, supplementation, scurvy

Objectives: There is almost no information regarding the vitamin C status of patients treated in Canadian and American hospitals. We determined the prevalence and predictors of vitamin C deficiency in patients hospitalized on the acute-care wards of a Canadian teaching hospital, and tracked their plasma vitamin C concentrations while they were there.

Methods: This was a population-based cross-sectional and time course survey of 149 medical patients shortly after admission to a university teaching hospital. The procedure for sample handling, storage and analysis was validated by measuring the vitamin C concentrations of a reference sample of 141 presumably well nourished people and comparing the results with published norms.

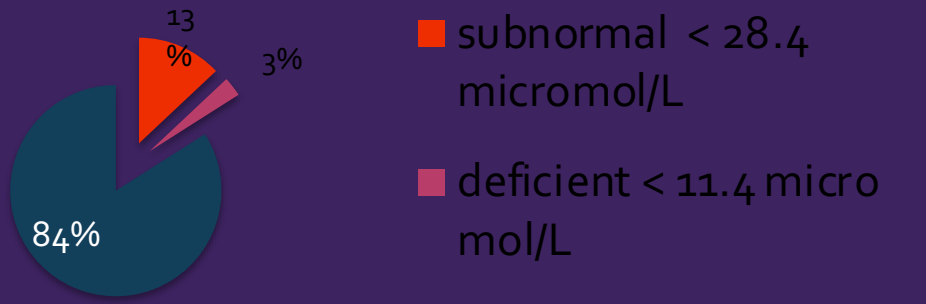
Results: In keeping with published norms, 13% of people in the reference group had a subnormal vitamin C concentration (<28.4 μmol/L) and 3% were vitamin C deficient (<11.4 μmol/L). By contrast, 60% of hospitalized patients had a subnormal vitamin C concentration and 19% were deficient. A history of inadequate nutrition or failure to use a vitamin supplement prior to admission, low serum albumin, and male sex predicted plasma vitamin C deficiency, whereas use of a vitamin supplement prior to admission was associated with adequate vitamin C status in hospital. In a second measurement, obtained in 52 patients after an average of 17 days in hospital, vitamin C status had not improved.

Conclusions: Vitamin C deficiency is prevalent and sustained in patients in a Canadian teaching hospital. The abnormality can be prevented by providing a diet sufficient in vitamin C or by prescribing a multiple vitamin tablet.

Gan 2008.
PMID: 18838532

Are people getting enough vitamin C?

Canada
Normal Reference Group/ Outpatients
N= 141



Gan 2008. PMID: 18838532

Admission Day
Canada Hospital Patients N=149



"The majority of patients had subnormal plasma vitamin C concentrations, and nearly one in five had a plasma vitamin C concentration compatible with scurvy."

Gan 2008. PMID: 18838532

Scurvy and vitamin C deficiency in an Australian tertiary children's hospital

Carolyn van Heerden [1 2 3], Daryl R Cheng [1 2 3 4], Sarah McNab [1 2 3], Rosemary Burgess [3], Ashleigh Russell [5], Yichun Wang [5], Freya Bleathman [1], Isabella Maharaj [1], Jerry Zhang [5], Marley Easterbrook [5], Marie Papadopulos [5], Laila F Ibrahim [1 2 3]

Affiliations + expand

PMID: 39031615 PMCID: PMC11656666 DOI: 10.1111/jpc.16594

Abstract

Aim: We aimed to investigate the frequency of vitamin C deficiency scurvy in the Australian paediatric context, describe cohorts at risk, and identify factors associated with development of symptoms in children with vitamin C deficiency. We also aimed to propose a management guideline for children with features of scurvy.

Method: A retrospective study was done at a tertiary paediatric hospital in Australia over a three-year period, from August 2019 to July 2022. Children from birth to 18 years old, whose vitamin C levels were low (<23 µmol/L), were included. Data extracted from hospital medical records included demographics, weight, co-morbidities, eating disorder diagnoses, clinical features, investigations and treatment. Descriptive statistics and risk statistics were performed.

Results: In a cohort of 887 patients who had their vitamin C levels checked, we identified 272 (31%) who had a vitamin C level <23 µmol/L. Of these, 13 (5%) were symptomatic of vitamin C deficiency and 19 (7%) may have been symptomatic. In patients with vitamin C deficiency, 248 (91%) had comorbidities, neurodevelopmental disorders being most common, and 176 (65%) had restricted eating. When the asymptomatic and symptomatic groups were compared, in the symptomatic group, there was a significantly lower vitamin C level and disordered eating related to autism spectrum disorders was more common.

Conclusion: In order to avoid delayed diagnoses and unnecessary investigations, clinicians should be familiar with symptoms of scurvy and perform a dietary assessment, vitamin C assay, and commence empiric vitamin C supplementation where appropriate.

Van Heerden 2024
PMID: 39031615

nutrients

MDPI

Article

Vitamin C Can Shorten the Length of Stay in the ICU: A Meta-Analysis

Harri Hemilä [1,*] and Elizabeth Chalker [2]

1 Department of Public Health, University of Helsinki, POB 41, FI-00014 Helsinki, Finland
2 School of Public Health, University of Sydney, Sydney 2006, Australia; elizabeth.chalker@gmail.com
* Correspondence: harri.hemila@helsinki.fi; Tel.: +358-41-5329987

Hemila 2019 PMID: 30934660

issue [82–89].

A survey of elderly Scottish patients hospitalized because of acute respiratory infections reported that 35% of patients had vitamin C plasma levels less than 11 μmol/L [82]. One study in a hospital in Paris reported that 44% of patients had vitamin C plasma levels less than 6 μmol/L [84], and in another hospital in Paris, 17% of patients had levels less than 11 μmol/L [85]. Another survey, of patients with advanced cancer in a hospice, found that 30% had vitamin C plasma levels less than 11 μmol/L [86]. In a Canadian university hospital, it was found that 19% of patients had vitamin C plasma levels less than 11 μmol/L [87]. In a study of surgical patients in Australia, it was found that 21% had vitamin C plasma levels less than 11 μmol/L [89]. Finally, in another study, 3% of cancer patients had clinical scurvy and vitamin C plasma levels less than 6 μmol/L [83], and in a survey of 145 hospitalized elderly French patients, 18 had clinical symptoms of scurvy [88]. Although these estimates of prevalence for vitamin C deficiency should not be extrapolated directly to other hospital settings, they demonstrate that low vitamin C levels are common in some contexts.

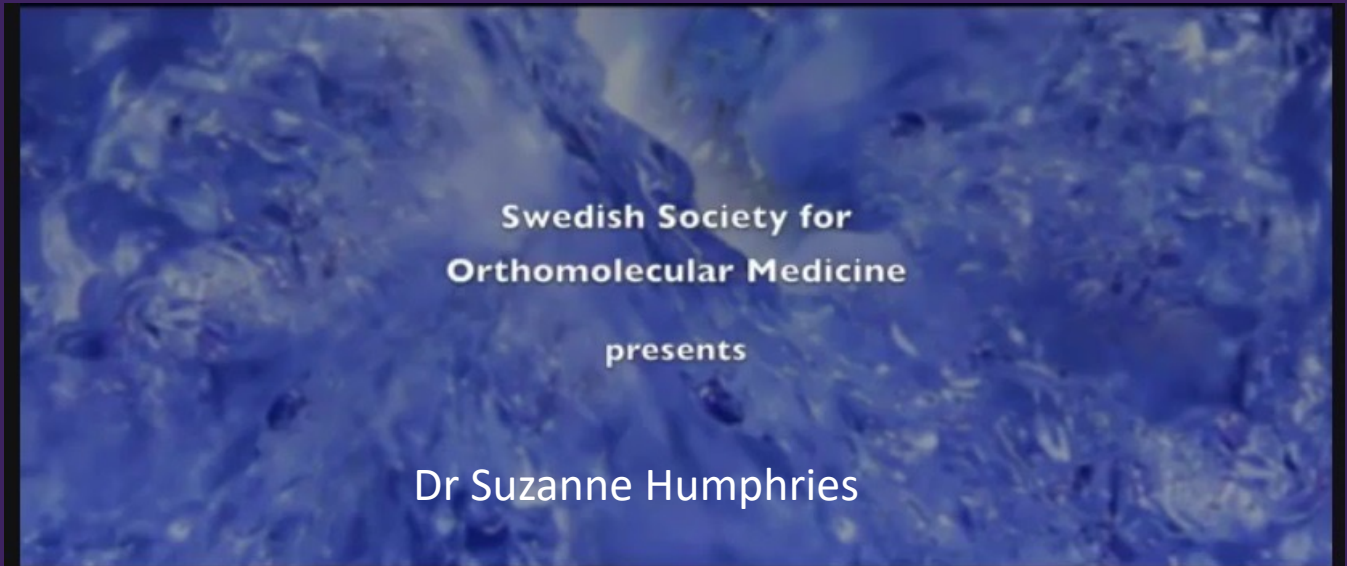
Given this, it would seem reasonable to screen plasma vitamin C levels in hospital patients when appropriate and administer vitamin C to patients with particularly low levels, irrespective of whether vitamin C is believed to be effective for conditions other than scurvy.

Hemila 2019 PMID: 30934660

https://odysee.com/@drsuzanneh:f?view=content



https://odysee.com/@drsuzanneh:f?view=content.



Lecture on Vitamin C to the Swedish Orthomolecular Society, Stockholm Sweden 2015.

Vitamin C the very foundation of life.

https://www.tandfonline.com/doi/full/10.1080/10942912.2024.2327335

INTERNATIONAL JOURNAL OF FOOD PROPERTIES
2024, VOL. 27, NO. 1, 493–515
https://doi.org/10.1080/10942912.2024.2327335

Taylor & Francis
Taylor & Francis Group

OPEN ACCESS Check for updates

Potential of ascorbic acid in human health against different diseases: an updated narrative review

Not on pubmed

Anwar Ali[a,b*], Sakhawat Riaz[c], Waseem Khalid[d,e], Maleeha Fatima[c], Umber Mubeen[c], Quratulain Babar[f], Muhammad Faisal Manzoor[g,h], Muhammad Zubair Khalid[i], and Felix Kwashie Madilo[j]

Potential of ascorbic acid in human health against different diseases: an updated narrative review

Ali 2024

Ascorbic acid (vitamin C) is the most crucial antioxidant for the body. The biochemical capabilities of ascorbic acid are still being studied. It acts as a cofactor for many enzymes participating in various physiological functions. This review presents how ascorbic acid is a cofactor for multiple enzymes involved in numerous human activities. Ascorbic acid protects the immune system, reduces allergic reaction severity and assists the fight against infections and other disorders. Ascorbic acid is metabolized by several procedures

Potential of ascorbic acid in human health against different diseases: an updated narrative review

Ali 2024

recycling, renal reuptake, and effective absorption in the digestive tract. The levels of ascorbic acid in tissues and serum may be precisely controlled by specific sodium-dependent vitamin C transporters or sodium vitamin C cotransporters (SVCTs).[16] The differing ascorbic acid requirements of distinct organs and tissues are reflected in the level of ascorbic acid. Brain, adrenal, and pituitary gland tissues have higher ascorbic acid concentrations than other tissues. One of ascorbic acid's primary functions can be imitated by its potential to serve as a cofactor for a variety of regulatory and biosynthetic enzymes, including those involved in the production of catecholamines and peptide hormones.[17]

infection. Hypovitaminosis C can trigger low mood symptoms. Numerous clinical symptoms might be linked to its severe deficiency.[9] Prolonged and severe ascorbic acid deficiency can result in some specific clinical syndromes, such as scurvy, a medical illness that requires hospitalization. Ascorbic acid plays countless functions in providing optimal health as well as

Potential of ascorbic acid in human health against different diseases: an updated narrative review

Ali 2024

Ascorbic acid, one of the least expensive therapeutic alternatives, may prevent and cure infections, toxins, autoimmune disorders, and cancer development. Ascorbic acid is a marvel for people with aesthetic preferences amid its role as an anti-aging agent that maintains skin tone and texture.

ascorbate.[43] Ascorbic acid is a vital nutrient because it is an antioxidant and a cofactor in many enzymatic processes. It plays a positive role in health by combating neurogenerative syndromes, cardiovascular disease, obesity and autoimmune disorders (Figure 2, Table 2). Despite being significant, ascorbic acid uptake has not received adequate research[44]

Table 2. Multiple effects of ascorbic acid against chronic diseases.

Administration	Diseases	Outcomes	Source
N.A	HIV-infected subjects	High oxidative stress in hospitalized HIV-infected adults; ASC ($p <$ .0001) and albumin ($p < .01$) were lower in HIV-patients relative to controls.	[48]
Not applicable (N.A)	Infection diseases	Low levels of ASC were proportional to infection disease severity	[49]
Intravenous administration	COVID-19	Large doses of ASC (10,000–20,000 mg/d) led to a shorter mean hospital length of stay compared with untreated patients with COVID-19 and no incidences of death	[50]
High-dose intravenous administration	Advanced cancer	Improved QoL in cancer patients	[51]
N.A	Hepatitis virus C	Oxidative stress was independently associated with recurrence of hepatitis virus C infection.	[52]
Intravenous administration	Metastatic and node-positive pancreatic cancer	Data suggested pharmacologic ascorbate administered concurrently with gemcitabine were well-tolerated. Initial data from this small sampling suggested some efficacy.	[53]
High-dose intravenous administration	Advanced cancer patients	Ascorbic acid administered i.v. at 1 g/min for 4 consecutive days/week for 4 weeks produced up to 49 mM ascorbic acid in patient's blood and was well tolerated. The recommended dose for future studies is 70–80 g/m^2	[54]
Oral administration	HIV	Exogenous antioxidant supplementation with ACS did not increase the antioxidant status in patients with HIV	[52]
Intravenous administration	Metastatic pancreatic cancer	The initial safety data did not reveal increased toxicity with the addition of ascorbic acid to gemcitabine and erlotinib in pancreatic cancer patients.	[54]
Oral administration	Diabetic patients	ASC increased HDL cholesterol and reduced systolic and diastolic blood pressure	[55]
Intravenous administration	Acute and chronic viral infectious	Protective effects with improvement of oxidative damage	[56]
Oral administration of orange juice	Hepatitis C under antiviral therapy	The serum levels of total cholesterol, LDL-cholesterol, c-reactive protein (CRP) and parameters of oxidative stress decreased in patients receiving orange juice. Moreover, alanine aminotransferase (AST) levels decreased significantly after oral administration of orange juice.	[57]
Oral administration	Patients with CVD	ASC prevented decline in endothelial function during sitting	[58]

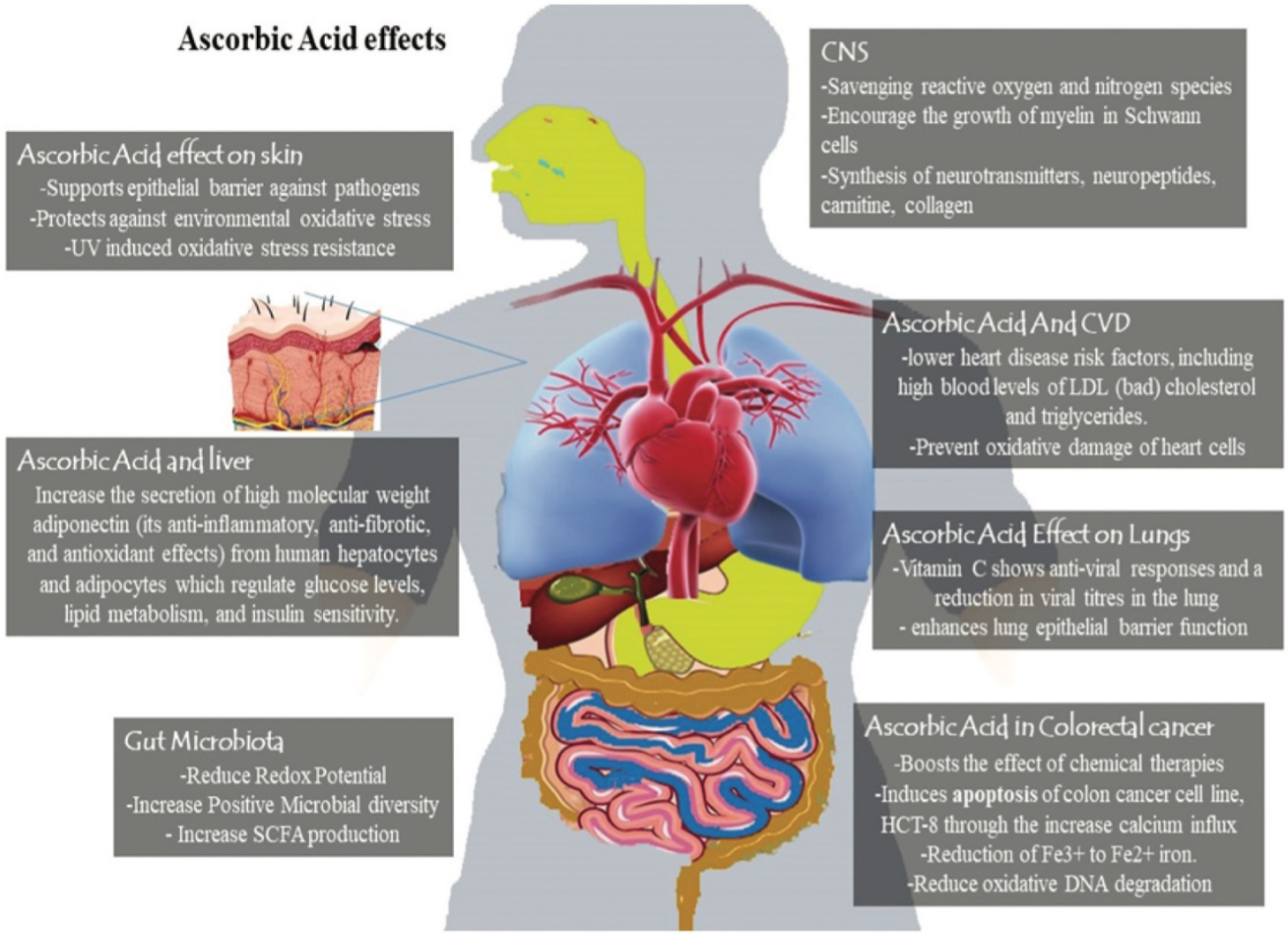


Figure 3. Positive Health effect of ascorbic acid.

A few actions of Vitamin C



- Anti-oxidant
  - Electron donor
    - Detoxicant
    - Prevents damage
- Anti-histamine
- Enzyme co-factor
  - Collagen
  - Neurotransmitters
  - Hormones
  - Carnitine

Chronic disease:

- **Diabetic control**
  - **Glucose handling improved with vit C**
    - **Insulin sensitivity**
    - **Insulin production/release**
  - **Higher requirements in diabetics/inflammation/competition**
  - **Insulin injection lowers vit C**
  - **Blood vessel health**

Chronic disease:

- **Heart disease**
  - **Blood vessels/inflammation**

    Villacorta 2007 PMID: 17624419

    Paterson 1941 PMID: 20321982
  - **Cholesterol metabolism**

    McRae 2008 PMID: 19674720
  - **High blood pressure**

    Juraschek 2012 PMID: 22492364

Effects of ascorbic acid on trabecular meshwork gene expression and collagen secretion

Holden 2026
PMID: 41692493

- **Study results. Several collagens and 96 genes are regulated by ascorbate in trabecular meshwork.**
- Aqueous humour has vitamin C concentrations of 20 – 70-fold higher than plasma and other biofluids
- Absence of vitamin C resulted in significant degradation of collagen type 1 and a decline in Trabecular meshwork cellular health.

Effects of ascorbic acid on trabecular meshwork gene expression and collagen secretion

Holden 2026
PMID: 41692493

- Addition of vitamin C resulted in several collagen chains being properly modified and secreted
- 76 genes were significantly upregulated
- 20 genes were downregulated
- The genes were involved in collagen synthesis extracellular matrix and remodelling, antioxidant, autophagy and specific signalling pathways.

Effects of ascorbic acid on trabecular meshwork gene expression and collagen secretion

Holden 2026
PMID: 41692493

- Vitamin C can decrease some types of glaucoma
- Prevents oxidative stress which can lead to intracellular accumulation of non-degradable material
  Without vitamin C collagen chains cannot form a stable triple helix, meaning that collagen is improperly folded making them vulnerable to degradation
- Vitamin C essential cofactor in maintain contractile functions and actin dynamics


2 tomatoes
60 mg
70 mg
per
11 mg
per
berry
300 mg
133 mg per 100 G
82 mg/
chopped cup
100 mg for 3
80 mg in
chopped
cup
140 mg for 2

Natural whole vitamin C

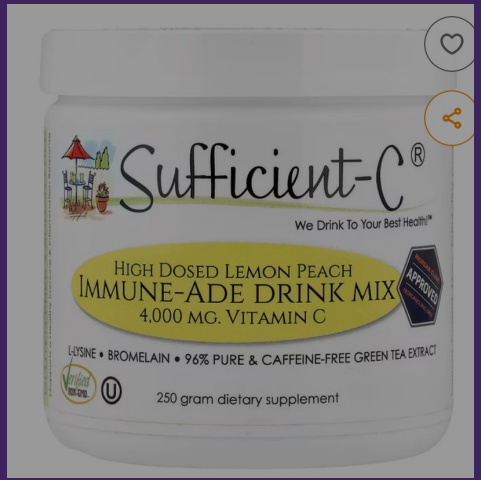
- Camu Camu
- Rose hips
- Acerola

Synthetic




NutriBiotic
Buffered
Sodium Ascorbate
Vitamin C
Crystalline Powder


Lypo-Spheric Vitamin C
1,000 mg Vitamin C • 1,000 mg Essential Phospholipids
LivOn
Net Contents 6 fl. oz. (171 mL)
30 PACKETS • 0.2 fl. oz. (5.7 mL) EACH


Sufficient-C®
We Drink To Your Best Health!™
HIGH DOSED LEMON PEACH
IMMUNE-ADE DRINK MIX
4,000 MG. VITAMIN C
APPROVED
L-LYSINE • BROMELAIN • 96% PURE & CAFFEINE-FREE GREEN TEA EXTRACT
250 gram dietary supplement