Precision Medicine in a Legal Context

Supporting the optimal functioning and capacity of clients

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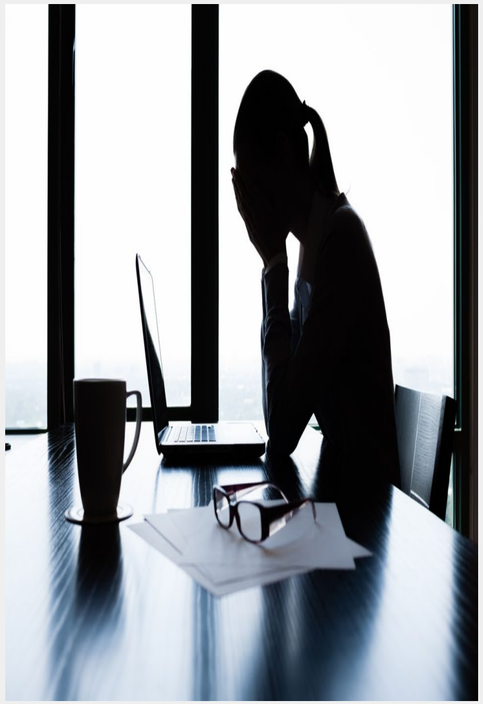
Disclaimer

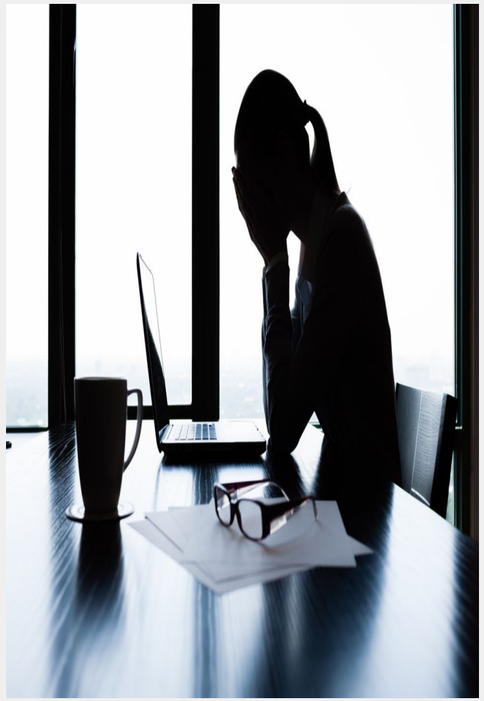
This information is for educational purposes only and is not intended as legal or medical. Always seek the advice of a qualified professional for your individual circumstances.

Sophie’s Story



- ·Very poor memory and brain function in general. Also mentioned multiple miscarriages.
- Was told no capacity to give instructions by previous lawyer
- Had seen her GP. No testing done but recommended she take an anti -depressant. Didn’t find this helped her memory or cognition at all.
- When asked if she had been sleeping and eating ok mentioned she followed a vegan diet. She didn’t take any supplements.

Sophie’s Story



- ·I recommended client see a particular health practitioner to discuss the possibility of testing for nutrient deficiencies.
- Client did indeed have a number of deficiencies including vitamin B12 and choline.
- After treatment there was a noticeable improvement, and we were engaged to represent her in domestic violence (DV) proceedings.
- Without treatment, it would have been very difficult for her to provide instructions, and be a witness in her own case.

Sophie’s case may seem extreme but unfortunately, she’s far from alone

- My practice is predominantly family law & domestic violence
- Mental health and cognitive issues are common (incl high anxiety/PTSD, depression, poor memory, lack of motivation, brain fog, even dissociation)
- Highly stressed clients - trauma prevalent
- Many clients are not only stressed from their current relationship; but have also experienced historical adversity (eg relationship trauma in childhood, sexual abuse etc).

- Research shows that adults who had been abused/neglected as children have higher rates of relationship breakdown in later life

▸ Front Psychiatry. 2025 Jan 22;15:1519699. doi: 10.3389/fpsyt.2024.1519699

The relationship between childhood trauma and romantic relationship satisfaction: the role of attachment and social support

Lijuan Quan [1,*], Kun Zhang [1], Haiyan Chen [1,*]

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PMCID: PMC11795211 PMID: 39911559

Childhood abuse and neglect and adult intimate relationships: a prospective study

Rebecca A Colman [1], Cathy Spatz Widom

Affiliations + expand

PMID: 15567020 DOI: 10.1016/j.chiabu.2004.02.005

Abstract

Objective: The present study extends prior research on childhood maltreatment and social functioning by examining the impact of early childhood physical abuse, sexual abuse, and neglect on rates of involvement in adult intimate relationships and relationship functioning.

- These days when clients are not functioning to their optimal capacity, I suggest we work closely with health practitioners (including those utilizing precision medicine) to help them improve their capacity and functioning.

- The better the client's functioning and capacity, the better the client can participate effectively in legal proceedings or in negotiating a resolution to their dispute

- This is not the way I have always practised. In my earlier years I did what most practitioners probably still do and suggest a client:

  1. To see their GP to address their mental health concerns. This could then include getting a mental health plan, or referral to another specialist if the GP thought that was warranted
  2. See a psychologist

- Unfortunately, most of the time the GP would spend about 10-15 minutes with them and then normally suggest an anti-depressant, or anti-anxiety medication. If they were lucky, some basic blood work may be ordered.

- Many clients were left disillusioned about the assistance or guidance offered. These days I am aware there are many more options available to clients.

High Stress or Trauma is not limited to family law

Legal practitioners are often required to work with clients who have experienced significant adversity. Consider:

- Criminal compensation/ victims of crime
- Workplace harassment
- Motor vehicle accidents
- Criminal offenders have often experienced adverse childhood experiences (ACES) or trauma

Australian Government
Australian Institute of Criminology

Trends & issues in crime and criminal justice

No. 651 June 2022

Adverse childhood experiences and trauma among young people in the youth justice system

Catia Malvaso, Andrew Day, Jesse Cale, Louisa Hackett, Paul Delfabbro and Stuart Ross

Abstract | This study examines the prevalence of adverse childhood experiences (ACEs) in a representative sample of young people under youth justice supervision in South Australia. The analysis showed that not only was the prevalence of ACEs particularly high in this population (89% experienced a combination of maltreatment and household dysfunction), but so too

In Sophie’s case her nutrient deficiencies were impacting her memory, but nutrients also play an important role in health in general, including mental health.

There is an increasing amount of research on the link between poor diet, mental health and criminal behaviour

DOI: 10.1002/brb3.2782

Brain and Behavior Open Access WILEY

ORIGINAL ARTICLE

The relationship between dietary patterns and aggressive behavior in adolescent girls: A cross-sectional study

Mahsa Malekahmadi[1,2] | Sayyed Saeid Khayyatzadeh[3] | Javad Heshmati[4] | Shadia Hamoud Alshahrani[5] | Nikzad Oraee[6] | Gordon A. Ferns[7] | Safieh Firouzi[8] | Naseh Pahlavani[9] | Majid Ghayour-Mobarhan[10]

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[3]Nutrition and Food Security Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

[4]Songhor Healthcare Center, Kermanshah University of Medical Sciences, Kermanshah, Iran

[5]Medical Surgical Nursing Department, King Khalid University, Khamis Mushate, Saudi Arabia

[6]Centre for Environmental Policy, Imperial College London, London, UK

[7]Brighton & Sussex Medical School, Division of Medical Education, Falmer, Brighton, Sussex, UK

[8]Department of Nutritional Sciences, Faculty of Health, Golestan University of Medical Sciences, Gorgan, Iran

[9]Health Sciences Research Center, Torbat Heydariyeh University of Medical Sciences, Torbat Heydariyeh, Iran

[10]Metabolic Syndrome Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

challenges

MDPI

Viewpoint

Nutrition, Behavior, and the Criminal Justice System: What Took so Long? An Interview with Dr. Stephen J. Schoenthaler

Alan C. Logan [1,*] and Stephen J. Schoenthaler [2]

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[2] College of the Arts, Humanities & Social Sciences, California State University, Turlock, CA 95202, USA; sschoenthaler@csustan.edu
* Correspondence: alanxlogan@gmail.com

Abstract: In the ongoing series of interviews, *Challenges* Advisory Board member and Nova Institute for Health Fellow Alan C. Logan meets with thought leaders, scientists, scholars, healthcare professionals, artisans, and visionaries concerned about health at the scales of persons, places, and the planet. Here, Dr Stephen J. Schoenthaler of California State University, Stanislaus, responds to a set of questions posed by *Challenges*. For over forty years, Dr. Schoenthaler has been at the forefront of the research connecting nutrition to behavior and mental health. In particular, Dr. Schoenthaler's work has examined relationships between dietary patterns, nutritional support, and behaviors that might otherwise be associated with criminality and aggression. Although the idea that nutrition is a factor in juvenile delinquency was popularized in the 1950s, the area received little scientific attention. In the 1970s, the idea that nutrition could influence behavior gained national attention in the US but was largely dismissed as "fringe", especially by those connected to the ultra-processed

Current Nutrition Reports (2025) 14:76
https://doi.org/10.1007/s13668-025-00668-7

REVIEW

Nutrition is Associated with Violent and Criminal Behaviors

Esma Asil[1] · Eda Erkmen[2,3]

Accepted: 27 May 2025

Abstract

Purpose of Review Psychological illnesses, mood disorders, anger and violent behaviors, which are increasing at an alarming rate today, not only negatively affect human health but also pose a threat to social life and security. The extant literature indicates that mental illnesses (e.g., depression and anxiety), negative affect (e.g., unhappiness and anger), and antisocial behaviors are associated with an increased likelihood of criminal behavior. Therefore, treating psychological disorders, improving mood and transforming negative behaviors into positive behaviors seems to be a potential strategy for reducing the crime rate and preventing crime. Given the existing literature associating nutrition with mood, behavior, and crime, this narrative review aims to examine the effects of nutrition on violent and criminal behavior.

Recent Findings Despite the common perception that an unhealthy diet is an effective strategy to improve mood, current research has shown that the opposite is true. The findings showed that healthy eating plays an important role in improving mood, treating psychological disorders and preventing negative behaviors. In addition to the therapeutic effects of a healthy diet, macro- and micronutrient deficiencies have been associated with a range of psychological disorders, including poor mood, violence and criminal behavior.

Summary A healthy diet with adequate amounts of macro- and micronutrients is essential for mental and physical health, as well as for the prevention and treatment of negative behaviors, and for the well-being, order and security of the individual and society.

Keywords Nutrition · Behavior · Mood · Crime · Violence

NeuroSci

MDPI

Viewpoint

The Intersection of Ultra-Processed Foods, Neuropsychiatric Disorders, and Neurolaw: Implications for Criminal Justice

Susan L. Prescott [1,2,3], Kathleen F. Holton [4], Christopher A. Lowry [5], Jeffrey J. Nicholson [6] and Alan C. Logan [1,*]

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4 Departments of Health Studies and Neuroscience, American University, Washington, DC 20016, USA; holton@american.edu
5 Department of Integrative Physiology, Department of Psychology and Neuroscience, Center for Neuroscience, and Center for Microbial Exploration, University of Colorado Boulder, Boulder, CO 80309, USA; christopher.lowry@colorado.edu
6 Law and Government, Humber College Institute of Technology & Advanced Learning, Toronto, ON M9W 5L7, Canada; jeffrey.nicholson@humber.ca
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Abstract: Over the last decade there has been increasing interest in the links between the consumption of ultra-processed foods and various neuropsychiatric disorders, aggression, and antisocial behavior. Neurolaw is an interdisciplinary field that seeks to translate the rapid and voluminous advances in brain science into legal decisions and policy. An enhanced understanding of biophysiological mechanisms by which ultra-processed foods influence brain and behavior allows for a historical reexamination of one of forensic neuropsychiatry's most famous cases—*The People v. White* and its associated 'Twinkie Defense'. Here in this Viewpoint article, we pair original court transcripts with

Review > Proc Nutr Soc. 2017 Nov;76(4):427-436. doi: 10.1017/S0029665117002026.
Epub 2017 Sep 25.

Nutritional psychiatry: the present state of the evidence

Wolfgang Marx [1], Genevieve Moseley [2], Michael Berk [2], Felice Jacka [2]

Affiliations + expand

PMID: 28942748 DOI: 10.1017/S0029665117002026

Abstract

Mental illness, including depression, anxiety and bipolar disorder, accounts for a significant proportion of global disability and poses a substantial social, economic and heath burden. Treatment is presently dominated by pharmacotherapy, such as antidepressants, and psychotherapy, such as cognitive behavioural therapy; however, such treatments avert less than half of the disease burden, suggesting that additional strategies are needed to prevent and treat mental disorders. There are now consistent mechanistic, observational and interventional data to suggest diet quality may be a modifiable risk factor for mental illness. This review provides an overview of the nutritional psychiatry field. It includes a discussion of the neurobiological mechanisms likely modulated by diet, the use of dietary and nutraceutical interventions in mental disorders, and recommendations for further research. Potential biological pathways related to mental disorders include inflammation, oxidative stress, the gut microbiome, epigenetic modifications and neuroplasticity. Consistent epidemiological evidence, particularly for depression, suggests an association between measures of diet quality and mental health, across multiple populations and age groups; these do not appear to be explained by

World Psychiatry
OFFICIAL JOURNAL OF THE WORLD PSYCHIATRIC ASSOCIATION (WPA)

► World Psychiatry. 2019 Sep 9;18(3):308–324. doi: 10.1002/wps.20672

The efficacy and safety of nutrient supplements in the treatment of mental disorders: a meta-review of meta-analyses of randomized controlled trials

Joseph Firth [1,2,3], Scott B Teasdale [4,5], Kelly Allott [3,6], Dan Siskind [7,8], Wolfgang Marx [9], Jack Cotter [10], Nicola Veronese [11,12], Felipe Schuch [13], Lee Smith [14], Marco Solmi [15,16], André F Carvalho [17,18], Davy Vancampfort [19,20], Michael Berk [6,9], Brendon Stubbs [21,22], Jerome Sarris [1,23]

► Author information ► Article notes ► Copyright and License information

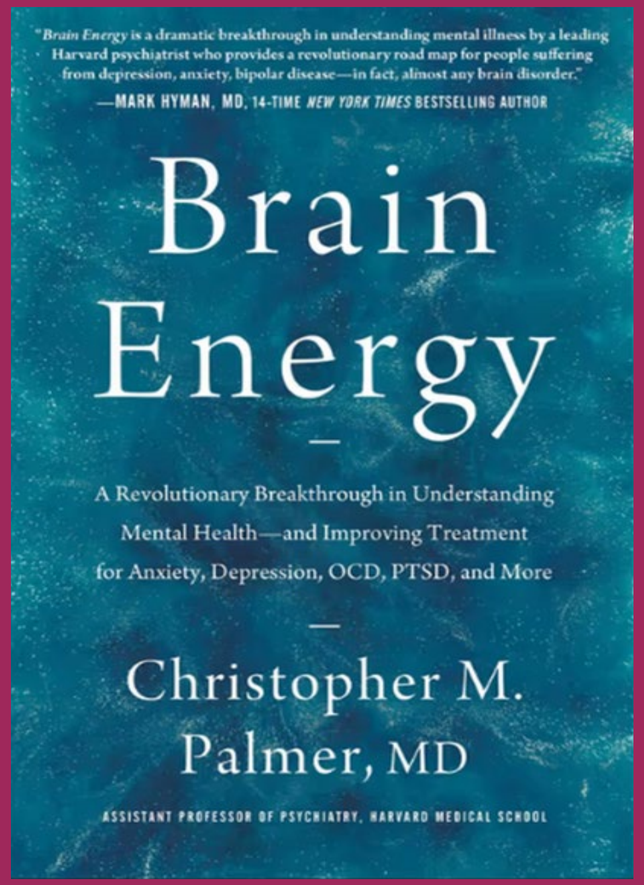
PMCID: PMC6732706 PMID: 31496103

Abstract

The role of nutrition in mental health is becoming increasingly acknowledged. Along with dietary intake, nutrition can also be obtained from “nutrient supplements”, such as polyunsaturated fatty acids (PUFAs), vitamins, minerals, antioxidants, amino acids and

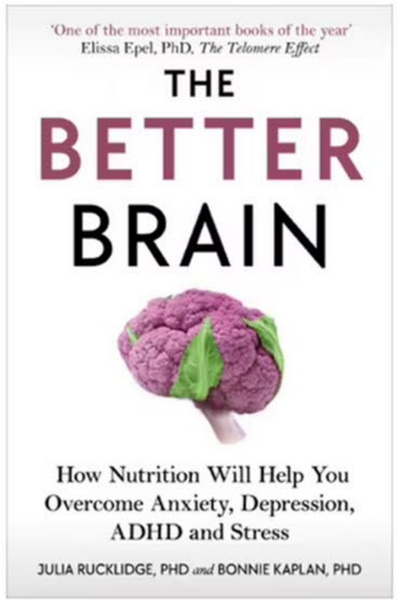
Areas such as Nutritional and Metabolic Psychiatry are increasingly being researched, and applied in practice.

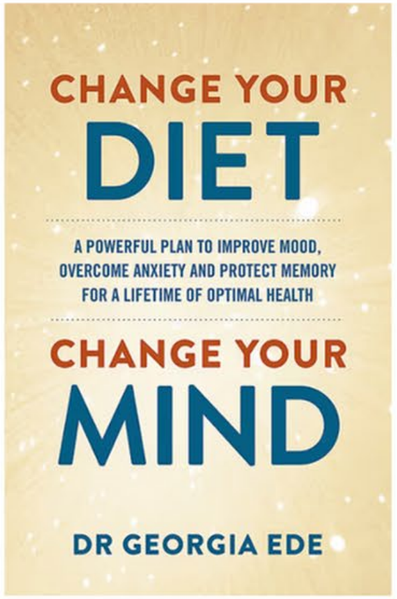
If you want to know more, some books you may wish to read include:

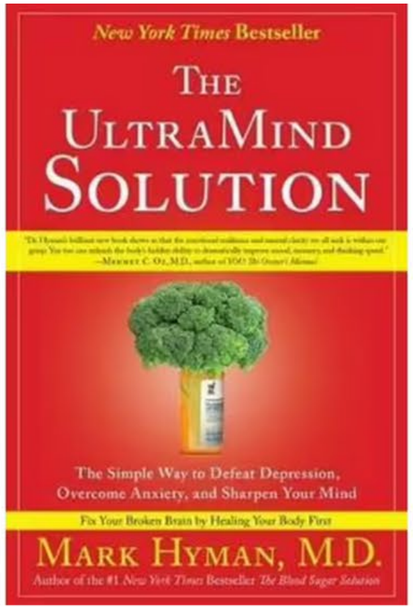


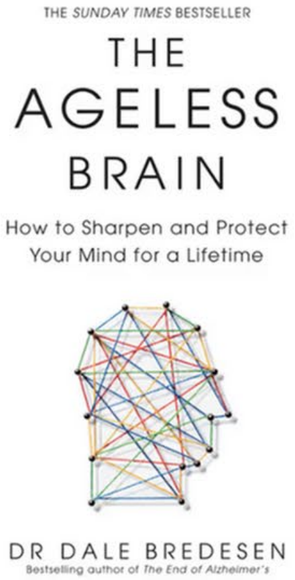
—Zoltán Sarnyai, MD, PhD, professor and head of the Laboratory of Psychiatric Neuroscience, James Cook University, Australia

"Dr. Christopher Palmer has written a must-read primer for anyone considering understanding and treating mental health. The book will guide you to understand why metabolism and mitochondria are fundamental to keep your brain healthy . . . a call to action to transform mental health treatment. Read this book—and learn from one of the best."


'One of the most important books of the year'
Elissa Epel, PhD, The Telomere Effect
THE
BETTER
BRAIN
How Nutrition Will Help You
Overcome Anxiety, Depression,
ADHD and Stress
JULIA RUCKLIDGE, PHD and BONNIE KAPLAN, PHD


CHANGE YOUR
DIET
A POWERFUL PLAN TO IMPROVE MOOD,
OVERCOME ANXIETY AND PROTECT MEMORY
FOR A LIFETIME OF OPTIMAL HEALTH
CHANGE YOUR
MIND
DR GEORGIA EDE


New York Times Bestseller
THE
ULTRAMIND
SOLUTION
The Simple Way to Defeat Depression,
Overcome Anxiety, and Sharpen Your Mind
Fix Your Broken Brain by Healing Your Body First
MARK HYMAN, M.D.


THE SUNDAY TIMES BESTSELLER
THE
AGELESS
BRAIN
How to Sharpen and Protect
Your Mind for a Lifetime
DR DALE BREDESEN
Bestselling author of The End of Alzheimer's

Sophie benefited from nutrient testing but there are many other tests that can be utilized to optimize a client's health and functioning including:

- Genetic Testing
- Epigenetic Testing
- Hormone Testing (eg Dried Urine Testing for Comprehensive Hormones - DUTCH)
- Hair and Blood samples
- Microbiome Testing
- Continuous Glucose Monitoring
- Wearables (eg Oura ring, Whoop, Apple watch etc)

Precision Medicine

- Precision medicine tailors healthcare to an individual's genetics, biology, environment, and lifestyle to target more effective, personalised prevention and treatment.

- Traditional medicine often uses one -size-fits-all treatments, may overlook root causes, relies on trial -and-error, and can miss lifestyle or genetic contributors.

NB - Precision, integrative and functional medicine are often used interchangeably because all emphasize personalised, root -cause care. Precision medicine focuses on genetics and biomarkers; integrative combines conventional and complementary therapies; functional medicine maps interconnected systems. All aim to tailor treatment beyond the one -size-fits-all model.

Benefits of precision medicine

- More targeted treatments → better outcomes, fewer side effects.
- Identifies root biological causes rather than symptoms alone.
- Prevention-focused, using genetics and biomarkers to detect risk early.
- Reduces trial-and-error prescribing, especially in mental health.
- May improves patient engagement through personalised plans.
- Useful for complex conditions (including trauma and mood disorders).

Disadvantages of Precision medicine

- Higher cost for tests (genomics, hormones, microbiome, functional panels).
- Not always covered by Medicare or insurance.
- Many practitioners not trained in precision medicine so can be hard to find a practitioner with requisite knowledge and experience

Why did testing help Sophie?

- Nutrients like choline and B12 are important for brain function
- When essential nutrients are deficient, brain function can be impaired
- B12 and Choline also important in another process in our body called “methylation”.Sometimes this is also called folate metabolism or “one carbon” metabolism. Problems with methylation can lead to a range of difficulties including in pregnancy, as may have been the case with Sophie.

Importance of Choline

- Acetylcholine is the major neurotransmitter to do with memory and the parasympathetic nervous system (PNS).
- Choline is an important ingredient in acetylcholine
- Our highest sources of choline are from animal products. Someone who isn’t eating animal products therefore may be at risk of low choline and therefore low acetylcholine.
- If we don’t eat enough choline we can make it in our bodies, but this can be difficult if B12 is also low.

SYSTEMATIC REVIEW OPEN

Transdiagnostic reduction in cortical choline-containing compounds in anxiety disorders: a ^{1}H-magnetic resonance spectroscopy meta-analysis

Richard J. Maddock[1]✉ and Jason Smucny[1]

BACKGROUND: Anxiety disorders (AnxDs) are highly prevalent and often untreated or unresponsive to treatment. Although proton magnetic resonance spectroscopy (1H-MRS) studies of AnxDs have been conducted for over 25 years, a consensus regarding neurometabolic abnormalities in these conditions is lacking.

METHODS: A systematic review and meta-analysis of 1H-MRS studies of AnxDs (social anxiety disorder, generalized anxiety disorder, and panic disorder) identified 25 published datasets meeting inclusion criteria. These compared neurometabolites between 370 patients and 342 controls, including n-acetlyaspartate (NAA), total creatine, total choline (tCho), myo-inositol, glutamate, glutamate+glutamine, GABA, and lactate.

RESULTS: Across AnxDs, tCho was significantly reduced in prefrontal cortex and across all cortical regions. Effect sizes for cortical tCho were significantly more negative in studies with better measurement quality, with Hedges' $g = -0.64$ and an 8% mean reduction. NAA was unchanged in prefrontal cortex but reduced across all cortical regions (after exclusions). These abnormalities did not differ between the three disorders. No other neurometabolites differed significantly.

DISCUSSION: Reduced choline-containing compounds in cortical regions is a consistent, transdiagnostic abnormality in AnxDs. Notably, arousal-related neuromodulators, including norepinephrine, alter membrane phospholipid homeostasis and methylation reactions, which influence brain tCho levels. This suggests that chronically elevated arousal in AnxDs may increase neurometabolic demand for choline compounds without a proportionate increase in brain uptake, leading to reduced tCho levels. Reduced cortical NAA suggests compromised neuronal function in AnxDs. Future studies may clarify the clinical significance of reduced cortical tCho and the possibility that appropriate choline supplementation could have therapeutic benefit in anxiety disorders.

Molecular Psychiatry (2025) 30:6020–6032; https://doi.org/10.1038/s41380-025-03206-7

> Am J Clin Nutr. 2025 Jan;121(1):5-13. doi: 10.1016/j.ajcnut.2024.11.001. Epub 2024 Nov 7.

Association of dietary choline intake with incidence of dementia, Alzheimer disease, and mild cognitive impairment: a large population–based prospective cohort study

Ying-Ying Niu [1], Hao-Yu Yan [1], Jian-Feng Zhong [1], Zhi-Quan Diao [1], Jing Li [1], Cheng-Ping Li [1], Lian-Hong Chen [1], Wen-Qi Huang [1], Miao Xu [1], Zhi-Tong Xu [1], Xiao-Feng Liang [2], Zhi-Hao Li [3], Dan Liu [4]

Affiliations + expand

PMID: 39521435 DOI: 10.1016/j.ajcnut.2024.11.001

Abstract

Background: Choline, an essential nutrient, plays a critical role in cognition, and may help prevent dementia and mild cognitive impairment. However, studies on dietary choline and its derivatives for preventing these conditions are limited and inconsistent.

Objective: The objective of this study was to explore the associations between dietary choline intake and the incidence of dementia, Alzheimer disease (AD), mild cognitive impairment (MCI), and current cognitive performance in the United Kingdom Biobank cohort.

Journal of Psychiatric Research
Volume 168, December 2023, Pages 279-292

Inflammatory markers in persons with clinically-significant depression, anxiety or PTSD: A systematic review and meta-analysis

J.K. Kuring [a], J.L. Mathias [a], L. Ward [a], G. Tachas [b]

https://doi.org/10.1016/j.jpsychires.2023.10.009

Highlights

Choline is also an important ingredient in phosphatidylcholine.

This is important for a number of reasons including:

- Healthy cell membranes
- Insulating neurons (myelin)
- Mitochondrial membranes
- Clearing fat soluble waste from the brain

Importance of B12

- Another nutrient important in brain health and energy production
- Low B12 may contribute to anxiety, depression, memory problems, neuropathy, fatigue, and even dementia -like symptoms.
- B12 is obtained almost exclusively from animal products
- Someone on a vegan diet may be low in B12 unless taking supplements

In Sophie’s case her vegan diet was likely impacting her levels of certain nutrients but many other factors are also important in building stress resilience and health

- Genetic factors
- How well we break down or absorb particular nutrients
- The amount of exercise we do
- The level of stress we are under (emotional, physical and chemical)
- Pregnancy

What 29 years as a solicitor has taught me

- While it is never the role of a lawyer to diagnose a client, making quality referrals is an important part of our job.
- The better our baseline knowledge about a particular area, the better our referrals can be, and the better our service to our clients.
- **One only sees what one looks for. One only looks for what one knows** – GOETHE
  [Quoted in Bredesen, D. E. (2025). The Ageless Brain: How to sharpen and protect your mind for a lifetime. (Chapter 6)]
- Having an understanding that nutrient deficiencies can impact brain health, helped me make a referral for Sophie to someone who was able to help her achieve dramatic improvements in her functioning.

Food for Thought

1. When clients engage a lawyer, are they more likely to be content with basic or standard service, or do they come hoping for optimal results & a premium service?
2. If a lawyer makes a referral for a client (particularly one experiencing high stress) is it preferrable to make:

- a cold referral (eg you should see a doctor, psychologist etc) or
- a warm referral (eg one that particularly considers the client's specific needs, the practitioner's scope, the reason for the referral and desired outcome)?

Food for Thought cont

There is a difference between multidisciplinary practice, and interdisciplinary practice.

Multidisciplinary practice offers multiple separate services with the burden of co-ordination falling on the client.

Interdisciplinary practice brings a variety of services together into a unified, client-centred approach. With the client's consent, knowledge is shared saving the client from repeatedly telling their story to numerous different practitioners. Practitioners work together in a co-ordinated approach with the view of achieving best possible

Some of the things I observe when clients are under high stress

- Reduced capacity for planning, organizing or processing information
- Anxiety/PTSD and hyperarousal
- Depression or hypo arousal (client may appear flat, numb, disconnected, lacking in motivation)
- Impaired memory or decision -making capacity
- Clients may be irritable, confrontational, reactive, or have difficulty managing emotions
- Clients may complain of fatigue, or difficulty sleeping
- Dissociation

Resilience to Stress can depend on many things

- Genetics/Epigenetics (incl vulnerabilities to oxidative stress, poor methylation, metabolic risk factors etc)
- Diet
- Sleep
- Exposure to toxins
- Hormones
- Inflammation and immune status
- Metabolic health
- Exercise
- Connection and sense of purpose
- Past experiences

Use of nutrigenomic testing

- Can help identify how your unique genes influence your nutrient needs, metabolic pathways, and responses to food, stress, and lifestyle, as well as how nutrients can, in turn, influence your gene expression. All of this can impact cognitive health, stress resilience and metabolic health.
- It does not diagnose disease. Instead, it highlights functional strengths and vulnerabilities that can guide personalised care

Testing can address detoxification pathways

Genes involved in detoxification influence how well you clear:

- Hormones (including stress hormones)
- Environmental toxins
- Alcohol
- Medications
- Fat-soluble waste

Vitamin D metabolism & bone health	VDR	Fok1 T>C	TC	●	●		
		Bsm1 G>A	GA	●	●		
		Taq1 T>C	TC	●	●		○
	CYP2R1	A>G	GG		●●●		
	GC	T>G	GG		●●●		
		1296 G>T	TT		●●●		
Vitamin A metabolism	BCO1	G>T	GT		●●		
		Ala379Val (C>T)	CC		○		
Vitamin B12 transport	FUT2	Gly258Ser G>A	GA		●●		
Lactose Intolerance	MCM6	-13910 C>T	TT		○		
Gluten intolerance	HLA	DQ2 / DQ8	Negative		○		
Alcohol metabolism	ALDH2	rs671 G>A	GG		○		
Iron			282CC &				

Phase I detoxification	CYP1A1	Ile462Val A>G	AA	○			
		T>C	TT	○			
Phase I detoxification - caffeine	CYP1A2	A>C	CA		●●		
Phase II detoxification	GSTM1	Insertion/Deletion	Deletion	●●●			
	GSTP1	313 A>G	GG	●●			
	GSTT1	Insertion/Deletion	Deletion	●●●	●●●		
	NQ01	609 C>T	TC	●●			
Antioxidant enzymes	eNOS	894 G>T	TT	●●●			●●●
	MnSOD/ SOD2	47 T>C (Val16Ala)	TC	○			●
	GPx	Pro198Leu	TT	●●●			
	CAT	-262 C>T	CT	●			

Periodontal Disease Risk/Inflammatory Disorders Section						
IL1-α	Ala114Ser	rs17561	TT	+/+		View Result
IL1-β	Phe105Phe	rs1143634	TT	+/+		View Result
IL1-a2	Intron Variant	rs1800587	TT	+/+		View Result
IL1RN	Ala23Ala	rs419598	TT	−/−		View Result
IL-6	Intron Variant	rs1800795	GG	+/+		View Result
Food Responses Section						
Sodium Sensitivity						
AGT	ATG>ACG	rs699	CT	−/+		View Result
ACE	G2328A	rs4343	GG	+/+		View Result
Caffeine Metabolism						
CYP1A2	Intron Variant	rs762551	AC	−/+		View Result
Lactose Intolerance Section						
MCM6	Intron Variant	rs4988235	TC	−/+		View Result
Coeliac Disease HLA 2.5/HLA DQ8/HLA DQ2.2						
DQ8	Single Nucleotide Variation	rs7454108	AA	−/−		
DQ2.5	Single Nucleotide Variation	rs2187668	CT	−/+		
HLA DQ2.2	Single Nucleotide Variation	rs2395182	TT	+/+		View Result
HLA DQ2.2	Single Nucleotide Variation	rs7775228	AA	−/−		
HLA DQ2.2	Single Nucleotide Variation	rs4713586	AA	+/+		
Linoleic Acid Level Section						

Vitamin B12 Transport and Absorption

TCN2	C766G	rs1801198	GG	+/+	🔴	View Result
FUT2	G772A	rs602662	GG	+/+	🔴	View Result
FUT2	G428A	rs601338	GG	+/+	🔴	View Result

Vitamin C Metabolism

SLC23A1	G790A	rs33972313	GG	-/-	🟢	View Result
GSTT1	Deletion	CNV	Not Detected	NULL	🔴	View Result
GSTM1	Deletion	CNV	Not Detected	NULL	🔴	View Result

Hormone testing

- Can provide a deep, detailed picture of cortisol patterns, adrenal function, stress resilience, and how your body metabolises hormones.

- It is far more informative than a single blood cortisol test because it looks at patterns over time, metabolites, and the entire stress pathway.

Since cortisol “steals” from the same precursor (pregnenolone), you can see:

- chronic stress → low sex hormones
- adrenal exhaustion → reduced DHEA
- downstream effects on mood, libido, sleep, cognition

Urinary Glucocorticoids

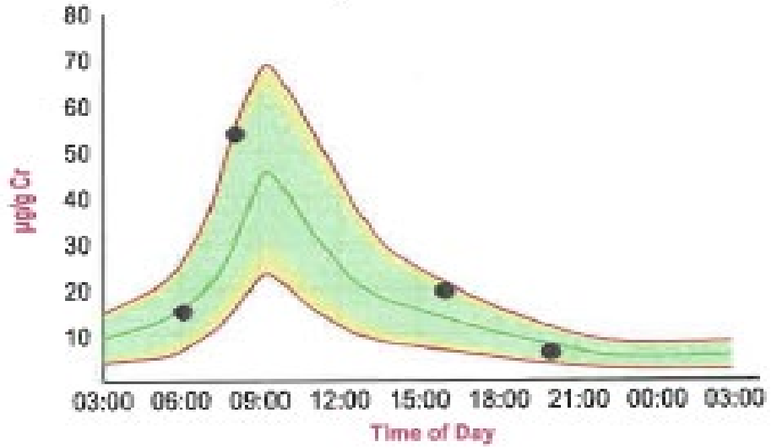
Total Cortisol	41.61 H	12.26-33.12 µg/g Cr Premeno-luteal
Total Cortisone	67.31 H	23.27-50.88 µg/g Cr Premeno-luteal
Cortisol/Cortisone	0.62	0.5-0.7
Tetrahydrocortisol	376	214-546 µg/g Cr Premeno-luteal
Tetrahydrocortisone	1020	437-1184 µg/g Cr Premeno-luteal

Urinary Free Diurnal Cortisol

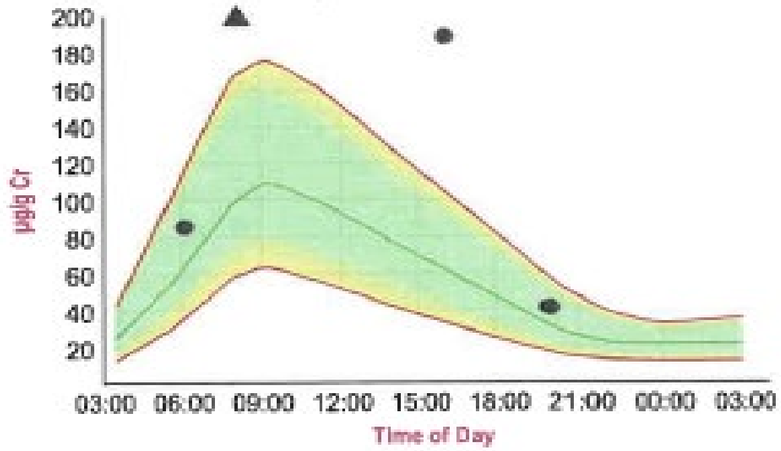
Free Cortisol	14.98	7.8-29.5 µg/g Cr (1st Morning)
Free Cortisol	53.78	23.4-68.9 µg/g Cr (2nd Morning)
Free Cortisol	19.39 H	6.0-19.2 µg/g Cr (Evening)

NutriPATH

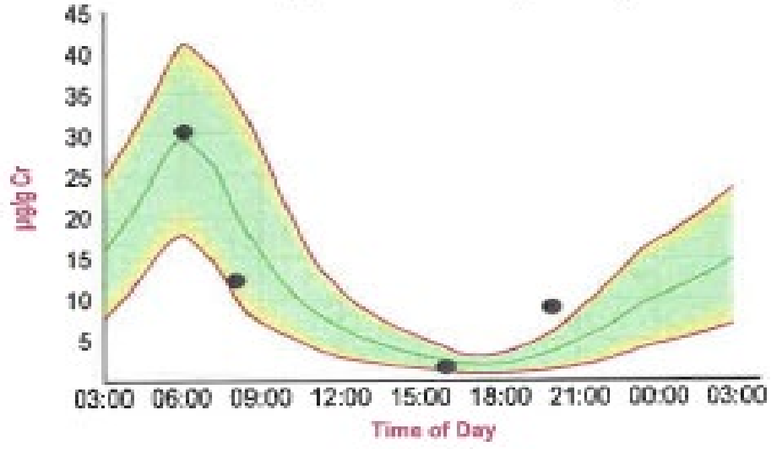
Urinary Free Cortisol



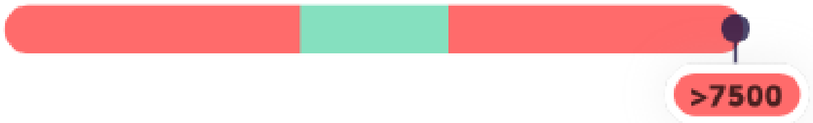
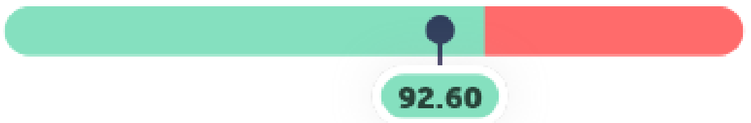
Urinary Free Cortisone



Urinary Melatonin (MT6s)



GASTROINTESTINAL HEALTH MARKERS

MARKER NAME		RANGE
Calprotectin *		≤ 50.00 µg/g
Faecal Occult Blood	NOT DETECTED	
Lactoferrin *		≤ 7.20 µg/g
Secretory IgA *		500.00 µg/g - 2,000.00 µg/g
Elevated secretory IgA is seen in patients with intestinal inflammation, intestinal permeability, IBS-D and autoimmune conditions. Interpretation should be made in the context of the patient's clinical presentation.		
Zonulin *		≤ 100.00 ng/ml

Benefits of Precision Medicine

- Uses objective, measurable biological date to tailor prevention and treatment
- Tailors advice to the individual rather than the “average” person
- Integrates various information about person including genetics, epigenetics & biochemistry using specialised testing
- Takes into account factors such as diet, lifestyle, sleep and other environmental factors
- Goal is to understand root causes, not just treat symptoms

Are trauma survivors treated less favourably than sportspeople when it comes to access to precision medicine?

- Precision medicine is widely accepted in elite sport
- Less in mental health and rarely applied in trauma
- Trauma survivors arguably need it *just as much*, if not more.

▸ Life (Basel). 2025 Jun 27;15(7):1023. doi: 10.3390/life15071023

Next-Generation Approaches in Sports Medicine: The Role of Genetics, Omics, and Digital Health in Optimizing Athlete Performance and Longevity—A Narrative Review

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Editor: Tao Huang

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Abstract

This review aims to provide a comprehensive framework for implementing precision sports medicine, integrating genetics, pharmacogenomics, digital health solutions, and multi-omics data. Literature review was conducted using MEDLINE, EMBASE, Web of Science, and Cochrane Library databases (January 2018–April 2024), focusing on precision medicine

Elite athletes receive:

- Blood panels
- Hormone tracking
- Genetic testing
- VO2 max, HRV, sleep quality
- Nutrient profiling
- Metabolic and mitochondrial assessments

In trauma care, however, we still often hear:
“It’s just psychological.”
“Talk therapy will fix it.”
“They’re stressed — not medically unwell.”

Yet trauma alters:

- Cortisol and HPA axis
- Mitochondrial function and ATP demand
- Inflammation
- Neurotransmitter balance
- Methylation and gene expression
- Sleep physiology
- Memory circuits (hippocampus, amygdala)

These are biological changes, not just emotional responses.

Under acute or prolonged trauma, the body must produce:

- More ATP
- More cortisol and adrenaline
- More antioxidants to counter ROS
- The body uses more methyl donors

A trauma victim’s physiological demand may equal or exceed that of an athlete under chronic load.

Challenge – How can we do better for victims of trauma?

- Should trauma victims have the same opportunities as elite sportspeople when it comes to precision medicine?
- Should there be more focus on an interdisciplinary approach to improve health outcomes for victims of trauma?
- How can we be proactive about optimising our own health when working in a high stress environment?