

# The Audible Release

## Gut-Brain Axis – Supporting Digestion, the Microbiome, and Bowels



By Jen Gantzer, DC, MS, FACN, DACBN, LAc

In July's newsletter I discussed the importance of the 4 routes of elimination in toxic body burden and one of the primary routes of excretion is a healthy gut and daily bowel movement. It may not be everyone's favorite topic, but it is absolutely a pillar of

health.

So, what exactly is a "healthy gut"? A balanced digestive tract promotes 2 vital physiological functions, bowel movements and gut microbiome, while additionally supplying us dietary nutrition. Physiological digestion must break the nutritional components of the food matrix to the smallest capacity for intestinal absorption, and if this does not occur, then the person is at risk of malnutrition because if it's not absorbed out of the gut into the bloodstream being made available to the body organs and tissues, then it either exits as feces or feeds the gut bugs known as the microbiome. We should be eating to maximize our nutritional absorption, called bioavailability. Next, we eat certain undigestible foods, known as fibers, which we do not possess enzymes for to digest, and they serve more very important functions being purposely *not* absorbed,

so *not* entering the bloodstream, systemically they prevent spikes in blood sugar being cardioprotective, but intestinally serve 2 vital roles: form stool for daily bowel movements and feed the gut commensal bugs through fermentation. We have more commensal bacteria than human cells and we need them. "A *similarly rough estimate of 1000 bacterial species in the gut with 2000 genes per species yields an estimate of 2,000,000 genes, 100 times the figure of approximately 20,000 human genes.*" Sender et al describes bacterial populations geographically in the human digestive tract as  $10^9$  saliva,  $10^3$  stomach and upper intestine,  $10^8$  lower intestine, and  $10^{11}$  in colonic large intestine. Zhu et al confirms more than 150x more bacterial genes and that diversity is required for human health not only in the gut but immune and systemically they explain "The human body is actually a super-organism that is composed of 10 times more microbial cells than our body cells...Gut bacteria are not only critical for regulating gut metabolism, but also important for host immune system as revealed by animal studies." (1-3)

This is the basis for probiotics vs prebiotics, where probiotics are eating the live strains such as a supplement of Lactobacillus or Bifidobacterium, Bacillus spores, or fungal Saccharomyces Boulardi but also

Continued on page 3

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**Details on pg-6**

## Mental health in chiropractic & conservative care – by Jordon VanderVeen, DC

Navigating through these challenging times is difficult for all ages. With chiropractic care, we can affect our patients physical state, and just as important, their mental state (1-4). A case report by Chu and Ng highlight this, *“This report highlights the rewarding outcomes from spinal adjustment in certain neuropsychiatric disorders. Long-term results of chiropractic adjustment in this particular case were very favorable.”* (1)

Kids are more isolated now than ever before. Like the kids, the high-risk geriatric community have found themselves forced into hiding with the current state of the world. We are seeing increased markers for depression and anxiety in these communities as suicides rates are increasing. Cupler et al says *“The chiropractic profession’s participation in suicide prevention improves the health and wellness of one’s community while also impacting the broader public health arena.”* (2)

Heart rate variability (HRV) has lowered from lockdowns and has created a population less tolerant to stress and more vulnerable to disease. Hye-Guem et al explains *“In conclusion, the current neurobiological evidence suggests that HRV is impacted by stress and supports its use for the objective assessment of psychological health and stress.”* (3) What steps can we take to ensure that we are implementing best practices and making proper referrals when needed? A great tool to identify these outcomes is the SF-12 Health Survey to assess both mental and physical health components; there are downloadable pdf forms and ways to interpret them online. The SF-12 is one of the most commonly utilized questionnaires to assess quality of life (4-5). According to Hinton et al, chiropractors do not regularly utilize this standardized outcome measure for baseline or response to treatment for health status (6) however it is a reliable source for detecting active and recent depressive disorders as well as a useful screening tool (7) and could be a valuable tool in conservative care offices and option for detecting and/or monitoring mental health status and quality of life measures.

Common referrals for patients not responding to care are to neurologists, orthopedic surgeons, and pain management. Depending on the mechanism of injury and progression of the disease process, a missed opportunity to help patients is considering options that target with their mental state. Psychologists are great for patients undergoing a lot of stress and cases of depression and anxiety. If it is a major psychological disorder, then a psychiatrist may be more beneficial. Aside from a psychologist referral, modalities like acupuncture, massage therapy, physical therapy and naturopathy may offer benefits to a patient not responding subjectively to chiropractic care. These forms of health care can give patients much needed one-on-one time while still addressing underlying physical ailments. Additionally, chiropractic care and spinal adjustments directly impact the central nervous system, which help reduce overall depressive and anxious behavior and can assist not only musculoskeletal complaints but also improve patient quality of life.

1 Chu ECP, Ng M. Long-term relief from tension-type headache and major depression following chiropractic treatment. *J Family Med Prim Care.* 2018;7(3):629-631. doi:10.4103/jfmpc.jfmpc\_68\_18

2 Cupler ZA, Daniels CJ, Anderson DR, Anderson MT, Napuli JG, Tritt ME. Suicide prevention, public health, and the chiropractic profession: a call to action. *Chiropr Man Therap.* 2021;29(1):14. Published 2021 Apr 14. doi:10.1186/s12998-021-00372-7

3 Kim HG, Cheon EJ, Bai DS, Lee YH, Koo BH. Stress and Heart Rate Variability: A Meta-Analysis and Review of the Literature. *Psychiatry Investig.* 2018;15(3):235-245. doi:10.30773/pi.2017.08.17

4 Vera-Villarroel P, Silva J, Celis-Atenas K, Pavez P. Evaluación del cuestionario SF-12: verificación de la utilidad de la escala salud mental [Evaluation of the SF-12: usefulness of the mental health scale]. *Rev Med Chil.* 2014 Oct;142(10):1275-83. Spanish. doi: 10.4067/S0034-98872014001000007. PMID: 25601112.

5 Huo T, Guo Y, Shenkman E, Muller K. Assessing the reliability of the short form 12 (SF-12) health survey in adults with mental health conditions: a report from the wellness incentive and navigation (WIN) study. *Health Qual Life Outcomes.* 2018;16(1):34. Published 2018 Feb 13. doi:10.1186/s12955-018-0858-2

6 Hinton PM, McLeod R, Broker B, Maclellan CE. Outcome measures and their everyday use in chiropractic practice. *J Can Chiropr Assoc.* 2010 Jun;54(2):118-31. PMID: 20520756; PMCID: PMC2875909.

7 Vilagut G, Forero CG, Pinto-Meza A, Haro JM, de Graaf R, Bruffaerts R, Kovess V, de Girolamo G, Matschinger H, Ferrer M, Alonso J; ESEMeD Investigators. The mental component of the short-form 12 health survey (SF-12) as a measure of depressive disorders in the general population: results with three alternative scoring methods. *Value Health.* 2013 Jun;16(4):564-73. doi: 10.1016/j.jval.2013.01.006. Epub 2013 Apr 23. PMID: 23796290.

yogurt/kefir cultures, mushroom ferment kombucha, cabbage ferment kimchi and sauerkraut as a few popular and delicious options. The prebiotics feed the gut commensal bugs as their nutrition source and these are the dietary roles of fibers, the carbohydrate starches and grains we cannot digest actually feed the bugs as their fuel source, and in return we get a very important bacterial metabolic waste-product, a short chain fatty acid butyrate, which then feeds the colon cells ensuring a healthy colon. Moreover, some fibers are less fermentable and more insoluble which means less food source for the bugs but great for forming stool and optimal bowel movements. **See page 14 for fibers, prebiotics, and probiotics.**

Understanding the foundational ways to support digestion ultimately effects both bowel and microbiome, and poor digestion as you may imagine, also negatively effects both. Digestion begins “structurally” in the mouth, with chewing and mixing of saliva which contains a beautiful array of water, enzymes, electrolytes, and antimicrobials and prepares the food bolus for the stomach. However, if you want to get *really* technical, digestion actually begins with the brain and the senses, in the cephalic phase of digestion, when smelling, touching, and seeing food and even thinking of food ramps up the signaling to the digestive tract’s glands and smooth muscle getting them ready to receive the food bolus and do their job: digest! Therefore, physiologically digestion requires 2 things to function: secretions and motility controlled by the *Rest & Digest (no Stress)* parasympathetic nervous system (acetylcholine) for this.

Additionally, the gastric phase requires a low mealtime pH accomplished by the hydrochloric acid which is physiologically coordinated to ensure the protein digesting pepsin is available too. The combination of acid stomach contents with pepsin protein digestion helps the food bolus rhythmically in waves exit the stomach to stimulate the rest of the digestive enzymes, bile, and acid neutralizing bicarbonate to bathe the nutritional dietary components and prepare them for absorption. This beautifully coordinated intrinsic digestive process is easily disrupted with stress the antagonist known as the *Fight & Flight (Stress!)* under the sympathetic nervous system (adrenaline/epinephrine). The stress response will be discussed in more detail in a future article. (4-5)

To promote optimal digestive function for absorption and nutritional bioavailability, plus a healthy gut for bowel movement and microbiome... sit and eat, chew, enjoy and appreciate your food to stimulate the cephalic response, and don't eat when you're angry or arguing, additionally substitute a digestive enzyme for an antacid to not negatively influence your mealtime pH, and if already on GERD Rx-PPIs then ensure to not overeat listening to satiety since the higher gastric pH causes food to stay in the stomach longer and can worsen the reflux. Additionally, restoring Rest & Digest plus secretions/motility is the very first step that must occur to promote the geographical environment that supports daily bowel movements and happy healthy gut bugs. (7-9)

1 Gilbert JA et al. Current understanding of the human microbiome. *Nat Med.* 2018;24(4):392-400.

2 Sender R, Fuchs S, Milo R. Revised Estimates for the Number of Human and Bacteria Cells in the Body. *PLoS Biol.* 2016;14(8):e1002533.

Published 2016 Aug 19.

3 Zhu B, Wang X, Li L. Human gut microbiome: the second genome of human body. *Protein Cell.* 2010 Aug;1(8):718-25.

4 Gropper, Sareen S.. *Advanced Nutrition and Human Metabolism.* Wadsworth Publishing.

5 Guillams G. *The Role of Stress and the HPA Axis in Chronic Disease Management.* Point Institute.

6 Konturek PC1, Brzozowski T, Konturek SJ. Stress and the gut: pathophysiology, clinical consequences, diagnostic approach and treatment options.

*J Physiol Pharmacol.* 2011 Dec;62(6):591-9.

7 Holscher HD. Dietary fiber and prebiotics and the gastrointestinal microbiota. *Gut Microbes.* 2017;8(2):172-184.

8 Majeed M et al. Evaluation of the Safety and Efficacy of a Multienzyme Complex in Patients with Functional Dyspepsia: an RCT. *J Med Food.* 2018;21(11):1120-1128.

9 Sanaka M et al. Effects of PPIs on gastric emptying: a systematic review. *Dig Dis Sci.* 2010 Sep;55(9):2431-40

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Dr. Jason Miller: Editor

The Audible Release provides news and information that is both educational and informative to the chiropractors and their associates in the Pinellas County area.

Society news, staff changes, personal announcements, photos and success stories are welcome. Articles about chiropractic procedures and issues concerning the practice of chiropractic should be submitted to the editor. Advertising inquires should be made to the publisher or visit us online at [www.pccschiro.org](http://www.pccschiro.org)

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\$50 ChiroPAC reception Friday

### September Speakers

June Drennon; Importance  
of Thermography Screenings  
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**Sept** Board meeting 14th 12:30pm Zoom

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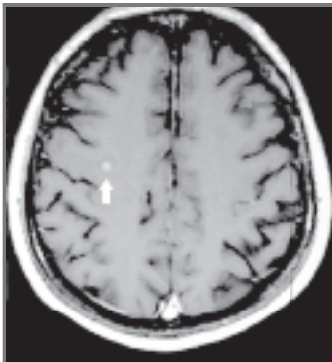
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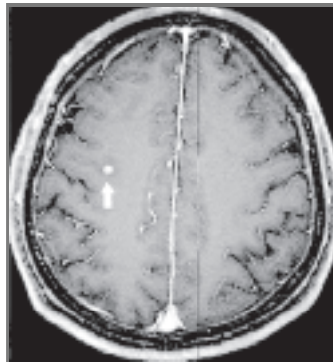
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*IT'S NOT WHAT YOU SEE.....*

*IT'S WHAT YOU MISS!*

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# THE RADIOLOGIST'S VIEW



## POOR IMAGE QUALITY? YOU DON'T KNOW WHAT YOU'RE MISSING

The proper utilization of diagnostic imaging is an essential component in the evaluation of a patient. This requires that the images are of optimum quality simply because the information available on an image is directly related to that quality. Similar to the adage used with computers, "garbage in,

garbage out", it can be said that with diagnostic images, poor quality, poor information. Quality equates to value. Poor quality images are of little value to the doctor and ultimately, to the patient. It is not enough that the images are adequate as there is a narrow range of acceptable diagnostic quality. A 50% vertebral body compression fracture or a grade 2 spondylolisthesis may be visible on the poorest quality images but what about the more subtle findings of pathology or small lesions that require optimum resolution? The following are a few of the many findings and conditions that can be missed without attention to technique detail.

### GENERAL CONSIDERATIONS

Often overlooked or at least underappreciated, is bone density and bone texture. While it may seem an easy task to recognize a loss of bone density, this appearance can easily be accentuated or missed by improper technique. Plain x-ray is unreliable as a mode to diagnose osteopenia. Add to that variation in technique and the false positive and negative result abound. Abnormal size, shape or alignment may be difficult to recognize due to improper technique or positioning. Soft tissues can be blurred by patient motion resulting in a false positive of infection or the tissues may be over penetrated resulting in a false negative when in fact a mass or joint effusion is present.

### TUMORS AND TUMOR-LIKE CONDITIONS

One of the most devastating conditions that can be overlooked is also the most common malignant bone tumor in the adult, metastatic disease. This usually presents in a lytic, blastic or mixed form and can appear as a lesion the size of a pea or opacity the entire pelvis. Poorly exposed images can mask this disease and result in delayed patient care and potential legal consequences. Primary bone tumors, although not as common, can also be missed. The subtle changes of several tumor-like conditions and metabolic diseases that cause subperiosteal resorption or endosteal scalloping would not be appreciated.

### FRACTURES

A severe vertebral body compression fracture, a spiral fracture of the femur or similar overt injuries should not create a diagnostic dilemma even with suboptimum image quality. But those are an easy clinical diagnosis and therefore the imaging finding is expected. However, a fracture such as a tibial plateau compression may appear as a faint radiopacity paralleling the subchondral bone of the

plateau and can easily be missed even on good quality images. It is important to realize that it is sometimes those subtle findings that are the most significant. A good example is a Segond fracture. A tiny avulsion fracture at the lateral aspect of the lateral tibial plateau that is frequently associated with tears of the anterior cruciate ligament. Or a volar plate fracture, that represents a capsular avulsion at the proximal interphalangeal joint that can result in instability. Other fractures of the extremities such as the torus or buckling type involving the radius, the dorsal chip fracture of the wrist, gamekeepers' thumb or stress fractures of the hip cannot be ruled out on poor quality images and have serious sequela if not recognized early. In the spine, extension teardrop and odontoid fractures can become occult without proper technique. Even dislocations can be overlooked due to incomplete views, inadequate technique or failing to appreciate the indirect signs of an injury. A good example of this would be a posteriorly dislocated capitellum associated with a supracondylar fracture in the pediatric elbow or a posterior dislocation of the glenohumeral joint.

### JOINT DISEASE

One of the most critical responsibilities when encountering a patient with potential joint disease is distinguishing between a degenerative and an inflammatory process. Further workup, prognosis and treatment options depend on the correct diagnosis. One of the most important factors used to make the distinction is the presence of erosions. Marginal erosions are a radiographic hallmark of an inflammatory arthropathy. These can be tiny marginal defects involving the small joints of the hand that require images of the utmost quality. Soft tissues evaluation is equally essential and also necessitate adherence to image excellence. The early diagnosis of sacroiliitis is important to properly manage a young patient who may be in the beginning stages of a spondyloarthropathy such as ankylosing spondylitis. Periarticular and other soft tissue calcifications can be an important clue as to the nature and differential of joint disease and many autoimmune conditions. Without the proper views and technique these too can become underappreciated or misinterpreted.

It may be more beneficial to simply state that good image quality is essential for the detection of abnormalities. Instead, a sampling of commonly encountered findings that may be missed with suboptimal images serves as a reminder of the numerous pathologies that can exist in the patients that you treat regardless of their initial presentation. An image cannot be considered acceptable just because you can see the anatomy. There is narrow latitude in what is considered an optimum image, and all images should be optimum. Don't just produce images on which you can barely count vertebral segments, produce, and insist on images that you can count on.

Terry D. Sandman, DC, MPH, DACBR  
drtsandman@aol.com

*NOTE: This article originally appeared in the 2021 2<sup>nd</sup> quarter FCA Journal*

- **Prebiotics:** Indigestible (for humans) carbohydrate substrate that feeds bacteria
  - Resistant starch is an insoluble fiber (unripe bananas, cooked and cooled potatoes, seeds, legumes, whole grains) – the fermentation of resistant starch produces SCFA
  - Non-starch polysaccharides
    - Inulin foods include chicory, garlic, onion, Jerusalem artichokes, jicama
    - FOS naturally found in chicory, onions, asparagus, wheat, tomatoes, veggies, grains, seaweed
  - Soluble fiber (psyllium husk, acacia fiber); pectin (apples); beta glucan (oats, mushrooms, seaweed); beans
- **Plant polyphenols:** fruits, seeds, vegetables, tea, cocoa
- **Special diets may lack prebiotics**
  - Paleo, low-carb, ketogenic, grain-free, low FODMAPs



**Table 4.1** Food Sources of Fiber

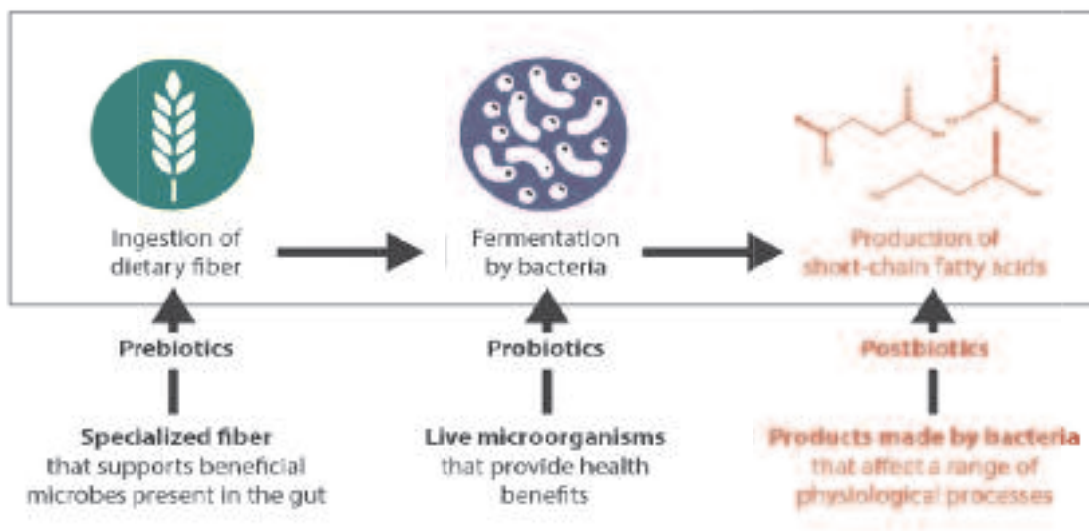
Type of Fiber	Examples of Food Sources
Cellulose	All plant foods, especially wheat bran, legumes, nuts, peas, root vegetables (such as carrots), vegetables of the cabbage family, celery, broccoli, coverings of seeds, and apples
Hemicellulose	Whole grains, especially bran, nuts, and legumes
Lignin	Whole grains, especially wheat bran, mature root vegetables (such as carrots), fruits with edible seeds (such as strawberries), and broccoli (especially the stalk)
Pectins	Citrus fruits, strawberries, apples, raspberries, legumes, nuts, some vegetables (such as carrots), and oat products
Gums	Oatmeal, barley, and legumes
β-glucans	Oat products and barley
Resistant starches	RS <sub>1</sub> : partially milled grains and seeds; RS <sub>2</sub> : unripe (green) bananas, legumes, raw potato, and high-amylose corn; RS <sub>3</sub> : rice, pasta, cold cooked potatoes, and high-amylose corn
Fructans	Chicory, asparagus, onion, garlic, artichoke, tomatoes, bananas, rye, and barley
Chitosan, chitin	Shells of crab, shrimp, and lobster

The optimal way to ensure maximal benefit from fiber is to eat a mixture of all the categories over the week or month

- Whole Grains\*
  - Oats
  - Nuts/Seeds
  - Legumes/Lentils/Beans
  - Cooked Cooled Rice/Potato
  - Quinoa
  - Vegetables & Root Vegetables
  - Fruits
- Grains - Gluten Free (GF)
  - Rice & Cooked Cooled Rice
  - Quinoa
  - Bran
  - Oats

\*Whole Grain breads/crusts are not GF

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\*Membership is for the chiropractor listed above only & is non-transferable.

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**NEW FOR 2021: General Meetings will be held In-Person and Virtual via Zoom to accommodate travel and social distancing\*\***

**\*\*General Meetings will remain postponed until further notice awaiting CDC post-holiday updates; returning as soon as possible**

PCCS membership annual dues support the chiropractic profession and Florida scope of practice;  
thank you for your chiropractic financial support

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Email Jen Comey, Executive Director [ED@PCCSChiro.org](mailto:ED@PCCSChiro.org) or Dr. Gantzer, President [drigantzer@gmail.com](mailto:drigantzer@gmail.com) with questions.

\*Contributions to the PCCS-PAC are not deductible as charitable contributions for federal income tax purposes.



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