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In this issue: Blood Pressure Delivers Life Yet is a Pacesetter for Biological Aging; SNiPPets: That Famous C677T SNP Affects Blood Pressure, Too; Food for Thought Video Series - External and Internal Toxicity (2 Episodes)

Blood Pressure Delivers Life Yet is a Pacesetter for Biological Aging

Right now, over 1.1 billion humans world-wide have high blood pressure, and around the globe, mean adult blood pressure is ~127/79 for men and ~122/77 for women.

Blood is a complex environment: full of substances that act as food or information, immune cells on a mission, messages flying among tissues and organs, incoming nutrients, waste destined for detoxification, toxins that got absorbed, damaged cells, and so on. In health, blood flows freely in larger blood vessels, but in capillaries, greater blood pressure is needed to counter resistance. In biological aging or in disease, though, vascular damage can narrow large arteries, making the heart work hard where it shouldn’t have to. In men’s blood, red blood cells take up more space, so men are less likely to get anemia but more likely to suffer heart attacks. Yet most blood is not within arteries—it’s in the venous system, which depends upon valves to prevent stagnation and back-flow. Physical activity is the main way to keep venous blood moving, though it doesn’t always have to be a hard work-out, and modest activities like walking, housecleaning, and yardwork effectively aid circulation, too.

The cardiovascular team includes the heart, arteries and veins, brain, kidneys and adrenals, lungs, and one’s senses and perceptions. This team is in constant conference, deciding where oxygen and nutrients are most needed. For instance, after a meal, different portions of the digestive tract ‘come online’ in precise sequence, and are fed more blood through expansion of blood vessels that deliver the blood’s bounty; but when one is intensely physically active, delivery of blood to the skeletal muscles and lungs—and drainage thereafter—becomes the higher priority, and blood flow to less-active areas decreases. Even red and white blood cells need steady supplies of energy and nutrients for their surveillance, communication, cleansing, and oxygen-carrying duties. At all times, though, the heart itself, the brain, and the kidneys remain richly
It’s no accident that all the members of the cardiovascular team work together to adjust blood pressure from moment to moment, as one’s ‘emotional environment’ (how one perceives and interprets events) signals receptors that communicate with the endocrine system to produce chemical messages that tell blood vessels to tense up or relax. This constant messaging reflects one’s experience of life, which is recorded in blood pressure and has much to do with how well one ages. Blood pressure describes how efficiently the cardiovascular team is working together and if anything is interfering with healthy function.

Consider this fairly healthy blood pressure: 100/68. The first number represents the systolic blood pressure:
- Systolic blood pressure, in this case 100, is the pressure (in millimeters of mercury) within an artery while the heart is at the peak of propelling blood through the body.
- Systolic blood pressure can change a great deal from one moment to another according to the body’s needs and activities, and represents how much immediate strain is placed on the heart.
- If this number stays over ~130 for too long, the heart is being asked for more than it can comfortably give, risking damage wherever heart muscle or blood vessels are weakest.

The second number represents the diastolic blood pressure:
- Diastolic blood pressure, 68 in this example, represents the brief instant of rest while the heart re-fills with freshly oxygenated blood from the lungs.
- Diastolic blood pressure varies much less than systolic, and represents how hard the heart is working while it’s supposed to be resting.
- When this number rises, it can indicate that the system has been chronically overworked, biological aging is occurring, and blood vessels have started to protect themselves by becoming less flexible.

In 2017, the American College of Cardiology and the American Heart Association announced updated blood pressure guidelines to help prevent complications that occur even at blood pressures previously considered normal. According to these new numbers, almost half of US adults have high blood pressure:
1. NORMAL; <120/<80
2. ELEVATED; 120-129/<80
3. STAGE 1 HYPERTENSION; systolic 130-139 OR diastolic 80-89
4. STAGE 2 HYPERTENSION; systolic ≥140 OR diastolic ≥90
5. HYPERTENSIVE CRISIS; systolic ≥180 AND/OR diastolic ≥120; requires prompt medical attention.

The body can endure enormous yet temporary challenges, but not year after year of unrelenting stress and ‘overtime work.’ When blood pressure stays high, the cardiovascular team is signaling that it needs a break. It’s not asking for pure leisure, though; it exists to serve the body, but asks for reasonable challenges. It will pump as much blood as it can while we mentally and emotionally process the stresses of life, yet appreciates the opportunity for a workout under more favorable conditions, like a brisk, rejuvenating walk through a park or forest. In our ancestors, blood pressure increased only when there was a specific reason for it to do so; even difficult times like famine, war, or dangerous weather tended to be episodic. It is likely that their systolic pressures changed quite a lot during active periods but their diastolic pressures remained relatively low over time.

High blood pressure is the #1 risk factor for cardiovascular and chronic kidney disease, and is soon expected to be the #1 global risk factor for premature death. For many people, blood pressure is responsive to nutrition, environment, behavior, and lifestyle. As a few examples:
- Spending time in quiet and/or natural settings; building regular, enjoyable, sweat-inducing physical activity into daily life; apps for staying relaxed, grounded, and mindful, like Calm or Breathing Zone.
- Ensuring adequacy of potassium and of omega-3 fats in your diet, and limiting your intakes of sodium (≤2000 mg daily) and alcohol (for women, ≤1 drink daily; for men, ≤2 drinks daily).
Marking the quality, source, and quantity of dietary proteins, fats, and carbohydrates, and increasing overall dietary nutrient density—total nutrient, fiber, and phytonutrient contents versus calories.

- Limiting exposure to pollution, tobacco, and toxins like lead and mercury, and considering medically-supervised metabolic detoxification to help reduce the body's toxic burden.
- Avoiding over-the-counter decongestant remedies.

The Greeks encouraged us to “know thyself,” while the American Heart Association expresses it in a different way: “know your numbers.” What is your blood pressure is when you are active and when you think you are relaxed? If you don’t know, consider getting and learning the correct way to use a blood pressure device or a blood pressure smart watch, and using apps for tracking and making sense of blood pressure over time. A few of these include Qardio, IBP, SmartBP, Blood Pressure Companion, Heart Habit, and iCardio Workout Tracker.

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**SNiPPets**

How significant to health are particular single nucleotide polymorphisms, also known as SNPs? SNiPPets is a ongoing exploration of this topic.

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**That Famous C677T SNP Affects Blood Pressure, Too**

One well-known locus in a well-known gene bearing a well-known common single-nucleotide polymorphism (SNP) demonstrates just how tightly woven network relationships can be for single ‘letters’ in our genetic “book of life.” The C-to-T switch at the rs1801133 locus of the MTHFR gene has long been noted for making the enzyme it codes for more sensitive to heat, thereby reducing its efficiency in metabolizing folate and remethylating homocysteine. The MTHFR gene has also been identified as having a strong bearing on blood pressure, as this same minor T variant is linked to increased risk for hypertension.

Research has clarified that individuals’ nutritional status for riboflavin (which is a co-factor for the enzyme methylene tetrahydrofolate reductase, or MTHFR) may represent an important connection between MTHFR gene activity and increased blood pressure. Among hypertensive patients (some of whom also showed cardiovascular disease), those homozygous for the minor T allele (thus having a TT genotype) at the rs1801133 locus were seen to respond to riboflavin supplementation with an appreciable reduction in blood pressure. While this effect appears to be limited to persons with the TT genotype at this genomic location, that description encompasses around 10 percent of the entire global population. In one study, half of these TT individuals already taking drugs for hypertension found that their blood pressure could be considered “controlled” upon simply taking 1.6 milligrams of riboflavin daily!

Individuals with one or more copies of the minor T variant at this MTHFR gene locus may wish to discuss nutritional and lifestyle strategies for optimizing their “methylation dance” steps (as methylation function is described by Functional Medicine practitioner Kara Fitzgerald, ND) and the many crucial functions it impacts. In this Functional Medicine Update, Dr. Bland provides background on how folate metabolism also directly influences blood pressure through...
More and more, studies and articles in top-tier medical journals are documenting situations involving toxic body burden due to chemical exposures in the environment. While there is some evidence that low-level exposure may lead to desensitization, the variables are proving to be very complex and highly individualized. Which chemicals are the most problematic? How much exposure is too much exposure? What downstream health consequences—chronic versus acute—are being seen clinically? So far, we know about interruptions in the bioenergetics of kidney function, an increased prevalence of asthma, and a lowering of mitochondrial function in tissues involving the vascular, immune, and neurological systems.

In this episode—Part 2—Dr. Bland focuses on the connections between toxicity and diet. Can particular diets be designed that will reduce toxic body burden through enhancement of elimination processes? This is a field of study that was pioneered by Paul Talalay, MD, a longtime researcher at Johns Hopkins School of Medicine who recently passed away at the age of 95. Dr. Talalay—along with many research teams that have followed in his footsteps—studied the ways that phytochemicals and other nutrients can modify the body’s detoxifying capabilities. Dr. Bland takes you through the science, the foods, and the key information you need to be informed.

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