

A blue blowtorch flame is shown against a black background. The flame is bright blue and has a wispy, flowing appearance. The nozzle of the blowtorch is visible in the bottom left corner, appearing as a golden-brown metal.

BURN FAT

WITH

THE METABOLIC BLOWTORCH DIET

**The Ultimate Guide for
Optimizing Intermittent Fasting:**
Burn Fat, Preserve Muscle, Enhance Focus
and Transform Your Health

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Bonus Chapter- BDNF:
Brain Derived Neurotrophic
Factor The Secret Ingredient
for Peak Performance And
Optimal Cognition

How would you like to effortlessly learn difficult things and memorize huge volumes of information at any age?

Do you want to tap into the ‘flow’ state that keeps you laser focused for hours on end?

Are you ready to see 10x jumps in your productivity and feel like you are literally on top of the world the second you wake up?

If that sounds like you, sit tight and read this chapter closely.

If you are serious about optimizing your brain for peak mental performance, you **NEED** to know about the life-changing benefits of BDNF!

Brain-Derived Neurotrophic Factor (BDNF)

There has been a significant amount of research done by scientists for the past 20 years on a chemical compound called BDNF.

It is a protein that triggers neurogenesis (the creation of brain cells, or ‘neurons’) in the hippocampus, while growing existing neurons and making the connections between them even stronger.

At the same time, BDNF allows for new connections between cells to form in the brain and it ensures cell survival at the same time by preventing apoptosis (cell death) from taking place.¹²⁹

Having higher levels of BDNF in your body will give you the following benefits:

- Increased learning capacity (learning takes place at a faster rate)¹³⁰
- Higher levels of intelligence¹³¹
- Improved ability to process, memorize and apply both new and existing information¹³²
- Lowers risk and Delays the progression of age-related neurodegenerative diseases like Alzheimer’s, Dementia

¹²⁹ Lipsky RH, Marini AM. Brain-derived neurotrophic factor in neuronal survival and behavior-related plasticity. *Ann N Y Acad Sci.* 2007;1122:130-43.

¹³⁰ Piepmeyer AT, Etnier JL. Brain-derived neurotrophic factor (BDNF) as a potential mechanism of the effects of acute exercise on cognitive performance. *J Sport Health Sci.* 2014;4:14-23.

¹³¹ Bekinschtein P, Cammarota M, Katche C, Slipczuk L, Rossato JI, Goldin A, Izquierdo I, Medina JH. BDNF is essential to promote persistence of long-term memory storage. *Proc Natl Acad Sci U S A.* 2008;105(7):2711-6.

¹³² Cunha C, Brambilla R, Thomas KL. A simple role for BDNF in learning and memory? *Front Mol Neurosci.* 2010;3:1.

and Parkinson's¹³³

- Elevated mood via promotion of anti-depressant activity¹³⁴
- Decreased levels of cortisol (the 'stress' hormone)¹³⁵

Above all else, BDNF enhances your cognition (mental sharpness) through neuroplasticity.¹³⁶ This is literally your brain changing its structure over time by forming new neural connections. The combined firing and wiring of these connections is how you form and retain new memories, thoughts, and skills. Furthermore, it's how your brain repairs and heals itself after an injury and/or a neurodegenerative disease that causes damage.

Breakthroughs in neurobiology research have revealed neuroplasticity to be a lifelong process that does not stop at any age.¹³⁷ It's extraordinary because we used to believe that it was impossible for neurons to regenerate (i.e. you had a fixed number of neurons at birth, and that's all you would ever get).

But in order for neuroplasticity to take place, you need sufficient levels of BDNF to facilitate the process. Better brain health means faster and more efficient neuron repair, so it is in your best interest to maximize BDNF production.

If you allow your BDNF levels to decline over time and let them stay at low levels, you can expect to experience some of the following outcomes:

- Depression¹³⁸
- Cognitive Decline¹³⁹
- Bipolar Disorder¹⁴⁰

¹³³ Lim YY, Villemagne VL, Laws SM, Pietrzak RH, Snyder PJ, Ames D, Ellis KA, Harrington K, Rembach A, Martins RN, Rowe CC, Masters CL, Maruff P. APOE and BDNF polymorphisms moderate amyloid β -related cognitive decline in preclinical Alzheimer's disease. *Mol Psychiatry*. 2015;20(11):1322-8.

¹³⁴ Björkholm C, Monteggia LM. BDNF - a key transducer of antidepressant effects. *Neuropharmacology*. 2016;102:72-9.

¹³⁵ Naveen GH, Varambally S, Thirithalli J, Rao M, Christopher R, Gangadhar BN. Serum cortisol and BDNF in patients with major depression-effect of yoga. *Int Rev Psychiatry*. 2016;28(3):273-8.

¹³⁶ Murray PS, Holmes PV. An overview of brain-derived neurotrophic factor and implications for excitotoxic vulnerability in the hippocampus. *Int J Pept*. 2011;2011:654085.

¹³⁷ Lillard AS, Erisir A. Old dogs learning new tricks: Neuroplasticity beyond the juvenile period. *Dev Rev*. 2011;31(4):207-39.

¹³⁸ Lee BH, Kim YK. The roles of BDNF in the pathophysiology of major depression and in antidepressant treatment. *Psychiatry Investig*. 2010;7(4):231-5.

¹³⁹ Siuda J, Patalong-Ogiewa M, Żmuda W, Targosz-Gajniak M, Niewiadomska E, Matuszek I, Jędrzejowska-Szypułka H, Rudzińska-Bar M. Cognitive impairment and BDNF serum levels. *Neural Neurochir Pol*. 2017;51(1):24-32.

¹⁴⁰ Fernandes BS, Molendijk ML, Köhler CA, Soares JC, Leite CM, Machado-Vieira R, Ribeiro TL, Silva JC, Sales PM, Quevedo J, Oertel-Knöchel V, Vieta E, González-Pinto A, Berk M, Carvalho AF. Peripheral brain-derived neurotrophic factor (BDNF) as a biomarker in bipolar disorder: a meta-analysis of 52 studies. *BMC Med*. 2015;13:289.

- Schizophrenia¹⁴¹
- Memory and Learning Problems (ex. forgetfulness),¹⁴² Particularly for Long-term Memory Formation¹⁴³
- Increased Risk (and faster progression) of Cognitive Disorders like Alzheimer's, Parkinson's¹⁴⁴
- Accelerated Aging¹⁴⁵
- OCD¹⁴⁶
- Psoriasis¹⁴⁷
- Anorexia Nervosa¹⁴⁸
- Diabetes¹⁴⁹
- Obesity¹⁵⁰

How to Naturally Maximize BDNF Production

Given that your BDNF levels will naturally decline as you age,¹⁵¹ you need to act NOW and start taking control of your mental health. The good news is you can naturally increase your BDNF levels to slow down any cognitive decline or even prevent it from happening altogether!¹⁵² It

¹⁴¹ Green MJ, Matheson SL, Shepherd A, Weickert CS, Carr VJ. Brain-derived neurotrophic factor levels in schizophrenia: a systematic review with meta-analysis. *Mol Psychiatry*. 2011;16(9):960-72.

¹⁴² Erickson KI, Prakash RS, Voss MW, Chaddock L, Heo S, McLaren M, Pence BD, Martin SA, Vieira VJ, Woods JA, McAuley E, Kramer AF. Brain-derived neurotrophic factor is associated with age-related decline in hippocampal volume. *J Neurosci*. 2010;30(15):5368-75.

¹⁴³ Alonso M, Bekinschtein P, Cammarota M, Vianna MR, Izquierdo I, Medina JH. Endogenous BDNF is required for long-term memory formation in the rat parietal cortex. *Learn Mem*. 2005;12(5):504-10.

¹⁴⁴ Zuccato C, Cattaneo E. Brain-derived neurotrophic factor in neurodegenerative diseases. *Nat Rev Neurol*. 2009;5(6):311-22.

¹⁴⁵ Budni J, Belletini-Santos T, Mina F, Garcez ML, Zugno AI. The involvement of BDNF, NGF and GDNF in aging and Alzheimer's disease. *Aging Dis*. 2015;6(5):331-41.

¹⁴⁶ Oliveira-Maia AJ, Castro-Rodrigues P. Brain-derived neurotrophic factor: a biomarker for obsessive-compulsive disorder? *Front Neurosci*. 2015;9:134.

¹⁴⁷ Brunoni AR, Lotufo PA, Sabbag C, Goulart AC, Santos IS, Benseñor IM. Decreased brain-derived neurotrophic factor plasma levels in psoriasis patients. *Braz J Med Biol Res*. 2015;48(8):711-4.

¹⁴⁸ Brandys MK, Kas MJ, van Elburg AA, Campbell IC, Adan RA. A meta-analysis of circulating BDNF concentrations in anorexia nervosa. *World J Biol Psychiatry*. 2011;12(6):444-54.

¹⁴⁹ Li B, Lang N, Cheng ZF. Serum levels of brain-derived neurotrophic factor are associated with diabetes risk, complications, and obesity: A cohort study from chinese patients with type 2 diabetes. *Mol Neurobiol*. 2016;53(8):5492-9.

¹⁵⁰ Lommatzsch M, Zingler D, Schuhbaeck K, Schloetcke K, Zingler C, Schuff-Werner P, Virchow JC. The impact of age, weight and gender on BDNF levels in human platelets and plasma. *Neurobiol Aging*. 2005;26(1):115-23.

¹⁵¹ Ziegenhorn AA, Schulte-Herbrüggen O, Danker-Hopfe H, Malbranc M, Hartung HD, Anders D, Lang UE, Steinhagen-Thiessen E, Schaub RT, Hellweg R. Serum neurotrophins--a study on the time course and influencing factors in a large old age sample. *Neurobiol Aging*. 2007;28(9):1436-45.

¹⁵² Musumeci G, Castrogiovanni P, Castorina S, Imbesi R, Szychlinska MA, Scuderi S, Loreto C, Giunta S. Changes in serotonin (5-HT) and brain-derived neurotrophic factor (BDNF) expression in frontal cortex and hippocampus of aged rat treated with high tryptophan diet. *Brain Res Bull*. 2015;119(Pt A):12-8.

will require you consistently doing a few things over a long period of time, but rest assured the effort will be worth it.

You already have the power to build a healthy, high-performance brain and you won't need any special tools to get started. The 'magic pill' for optimal cognition consists of two very simple practices:

Intermittent Fasting

Intermittent fasting has been shown to increase BDNF levels in several studies, especially when the fasting windows are maxed out.^{153,154,155} Put simply, intermittent fasting refers to the practice of abstaining from food for an extended period of time. For most people, this means you would skip your breakfast and consume your daily caloric intake within a shorter period of time (lunch and dinner).

Because you're reading this book right now, you're already familiar with how to use the best intermittent fasting protocol in the world. The Metabolic Blowtorch Diet gives you all-day energy and maximum focus, due to the incredible amount of BDNF produced in the brain during long fasting windows.

High Intensity Aerobic Exercise

The connection between increased BDNF levels and high intensity exercise has been well-established in numerous scientific studies.^{156,157,158} Naturally, more BDNF is produced with more frequent exercise. On top of the BDNF boost, you will also produce various neurochemicals that will regulate your mood and energy (dopamine, epinephrine, serotonin, and more).¹⁵⁹

There is no way of getting around this – you **MUST** exercise consistently if you want to experience the full benefits of higher

¹⁵³ Mattson MP. Energy intake, meal frequency, and health: a neurobiological perspective. *Annu Rev Nutr.* 2005;25:237-60.

¹⁵⁴ Longo VD, Mattson MP. Fasting: molecular mechanisms and clinical applications. *Cell Metab.* 2014;19(2):181-92.

¹⁵⁵ Marosi K, Mattson MP. BDNF mediates adaptive brain and body responses to energetic challenges. *Trends Endocrinol Metab.* 2014;25(2):89-98.

¹⁵⁶ Griffin EW, Mullally S, Foley C, Warmington SA, O'Mara SM, Kelly AM. Aerobic exercise improves hippocampal function and increases BDNF in the serum of young adult males. *Physiol Behav.* 2011;104(5):934-4.

¹⁵⁷ Winter B, Breitenstein C, Mooren FC, Voelker K, Fobker M, Lechtermann A, Krueger K, Fromme A, Korsukewitz C, Floel A, Knecht S. High impact running improves learning. *Neurobiol Learn Mem.* 2007;87(4):597-609.

¹⁵⁸ Erickson KI, Voss MW, Prakash RS, Basak C, Szabo A, Chaddock L, Kim JS, Heo S, Alves H, White SM, Wojcicki TR, Mailey E, Vieira VJ, Martin SA, Pence BD, Woods JA, McAuley E, Kramer AF. Exercise training increases size of hippocampus and improves memory. *Proc Natl Acad Sci U S A.* 2011;108(7):3017-22.

¹⁵⁹ Lin TW, Kuo YM. Exercise benefits brain function: the monoamine connection. *Brain Sci.* 2013;3(1):39-53.

BDNF levels. Sitting still for long hours, in some cases, will actually reduce your cognition slightly. One exercise session will not be enough to experience a significant change in BDNF levels.

Specifically, the best form of exercise to do is steady state aerobic exercise.¹⁶⁰ 30-40 minutes of training at 65-80% of your maximum heart rate has shown to lead to the highest increases in BDNF levels.¹⁶¹ Some studies claim interval training leads to greater increases than continuous, steady-state training.¹⁶²

Regardless of which form of aerobic training is best for BDNF formation, we can all agree that consistent aerobic training leads to sudden improvements in blood flow, which allows for certain growth factors to be transported into your brain in order to create BDNF.¹⁶³

How to Combine Both Strategies

If you want to experience a massive short-term and long-term boost in BDNF levels, you need to combine several strategies at once. Here is the step-by-step formula for extraordinary levels of cognition through BDNF optimization:

First, use The Metabolic Blow Torch Diet and make a conscious effort to max out your fasting windows. If you have 24 hours in a day, you would have an 18-21 hour fast window and a 3-6 hour feeding window. The more time you can spend in a fasted state, the better.

Second, you want to do steady state or depending on the level of muscular development you possess high intensity interval training (HIIT) cardio on the days you are fasting. Fasted cardio in the morning will do wonders to jack up your BDNF levels and give you a rush of feel-good chemicals that will brighten up your mood.

After your cardio, you will experience a spike in BDNF that will return to a normal level after several minutes (or even a few hours). Exercise alone will not be sufficient for cognitive optimization – you must pair the

¹⁶⁰ Dinoff A, Herrmann N, Swardfager W, Liu CS, Sherman C, Chan S, Lanctôt KL. The effect of exercise training on resting concentrations of peripheral brain-derived neurotrophic factor (BDNF): A meta-analysis. *PLoS One*. 2016;11(9):e0163037.

¹⁶¹ Schmolesky MT, Webb DL, Hansen RA. The effects of aerobic exercise intensity and duration on levels of brain-derived neurotrophic factor in healthy men. *J Sports Sci Med*. 2013;12(3):502-11.

¹⁶² Saucedo Marquez CM, Vanaudenaerde B, Troosters T, Wenderoth N. High-intensity interval training evokes larger serum BDNF levels compared with intense continuous exercise. *J Appl Physiol* (1985). 2015;119(12):1363-73.

¹⁶³ Thomas AG, Dennis A, Bandettini PA, Johansen-Berg H. The effects of aerobic activity on brain structure. *Front Psychol*. 2012;3:86.

physical stimulation with some mental stimulation immediately after.

Third, you are going to perform a difficult, challenging task right after your cardio. This should be something that requires a ton of brain power (critical thinking, writing, producing content, using creative/artistic energy, etc.). Your mind is now in the most optimal state to handle cognitively demanding tasks. Also, make sure you are devoid of all distractions and potential interruptions before you begin. This is best done in seclusion in an office or studio where nobody can bother you.

(BONUS: have a nice cup of plain black coffee to sip on while you are completing the task!)

Now that you know all about the game-changing benefits of BDNF, and how to maximize its production for achieving peak performance, go out there and change the world.

