

Reversing Chronic Kidney Disease with Niacin and Sodium Bicarbonate

By Stephen McConnell and W. Todd Penberthy

Orthomolecular Medicine News Service

Complete References

1. Kidney Disease Statistics for the United States. NIDDK. National Institute of Diabetes and Digestive and Kidney Diseases. <https://www.niddk.nih.gov/health-information/health-statistics/kidney-disease>
2. National Center for Health Statistics (2021) Deaths and Mortality. FastStats. <https://www.cdc.gov/nchs/fastats/deaths.htm>.
3. US Renal Data System. (2018) Chapter 1: Incidence, Prevalence, Patient Characteristics, and Treatment Modalities. 2:291-331. https://www.usrds.org/media/1736/v2_c01_increv_18_usrds.pdf
4. Ketteler M, Block GA, Evenepoel P, et al. (2018) Diagnosis, Evaluation, Prevention, and Treatment of Chronic Kidney Disease - Mineral and Bone Disorder: Synopsis of the Kidney Disease: Improving Global Outcomes 2017 Clinical Practice Guideline Update. *Ann Intern Med* 168:422-430. <https://pubmed.ncbi.nlm.nih.gov/29459980>
5. Eto N, Miyata Y, Ohno H, Yamashita T. (2005) Nicotinamide prevents the development of hyperphosphataemia by suppressing intestinal sodium-dependent phosphate transporter in rats with adenine-induced renal failure. *Nephrology Dialysis Transplantation* 20:1378-1384. <https://pubmed.ncbi.nlm.nih.gov/15870221>
6. Katai K, Tanaka H, Tatsumi S, et al. (1999) Nicotinamide inhibits sodium-dependent phosphate cotransport activity in rat small intestine. *Nephrology Dialysis Transplantation* 14: 1195-1201 (1999). <https://pubmed.ncbi.nlm.nih.gov/10344361>
7. Fouque D, Vervloet M, Ketteler M. (2018) Targeting Gastrointestinal Transport Proteins to Control Hyperphosphatemia in Chronic Kidney Disease. *Drugs* 78:1171-1186. <https://pubmed.ncbi.nlm.nih.gov/30022383>
8. Berns JS. (2008) Niacin and Related Compounds for Treating Hyperphosphatemia in Dialysis Patients. *Semin Dial* 21:203-205. <https://pubmed.ncbi.nlm.nih.gov/18363600>
9. Park CW. (2013) Niacin in patients with chronic kidney disease: Is it effective and safe? *Kidney Research and Clinical Practice* 32:1-2. <https://pubmed.ncbi.nlm.nih.gov/26889431>
10. Kang HJ, Kim DK, Lee SM, et al. (2013) Effects of low-dose niacin on dyslipidemia and serum phosphorus in patients with chronic kidney disease. *Kidney Research and Clinical Practice* 32:21-26. <https://pubmed.ncbi.nlm.nih.gov/26889433>



Reversing Chronic Kidney Disease with Niacin and Sodium Bicarbonate

References

11. Taketani Y, Masuda M, Yamanaka-Okumura H, et al. (2015) Niacin and Chronic Kidney Disease. *Journal of Nutritional Science and Vitaminology*, *J Nutr Sci Vitaminol* 61:S173-S175. <https://pubmed.ncbi.nlm.nih.gov/26598845>
12. Cheng SC, Young DO, Huang Y, Delmez JA, Coyne DW. (2008) A Randomized, Double-Blind, Placebo-Controlled Trial of Niacinamide for Reduction of Phosphorus in Hemodialysis Patients. *Clin J Am Soc Nephrol*. 3:1131-1138. <https://pubmed.ncbi.nlm.nih.gov/18385391>
13. Charnow JA (2014) Niacin May Slow Chronic Kidney Disease (CKD) Progression. *Renal and Urology News*. <https://www.renalandurologynews.com/home/conference-highlights/kidney-week-annual-meeting/kidney-week-2014/kidney-week-2014-general-news/niacin-may-slow-chronic-kidney-disease-ckd-progression>.
14. Rao M, Steffes M, Bostom A, Ix JH. (2014) Effect of niacin on FGF23 concentration in chronic kidney disease. *Am J Nephrol* 39, 484-490. <https://pubmed.ncbi.nlm.nih.gov/24854458>
15. Ginsberg C, Ix JH. (2016) Nicotinamide and phosphate homeostasis in chronic kidney disease: *Curr Opin Nephrol Hyperten*. 25:285-291. <https://pubmed.ncbi.nlm.nih.gov/27219041>
16. Streja E, Kovesdy CP, Streja DA, et al. (2015) Niacin and Progression of CKD. *Am J Kidney Dis*. 65:785-798. <https://pubmed.ncbi.nlm.nih.gov/25708553>
17. Rennick A, Kalakeche R, Seel L, Shepler B. (2013) Nicotinic Acid and Nicotinamide: A Review of Their Use for Hyperphosphatemia in Dialysis Patients. *Pharmacotherapy*. 33:683-690. <https://pubmed.ncbi.nlm.nih.gov/23526664>
18. Khalid SA, Inayat F, Tahir MK, et al. (2019) Nicotinic Acid as a Phosphate-lowering Agent in Patients with End-stage Renal Disease on Maintenance Hemodialysis: A Single-center Prospective Study. *Cureus* 11:e4566. <https://pubmed.ncbi.nlm.nih.gov/31281749>
19. Shimoda K, Akiba T, Matsushima T, et al. (1998) [Niceritrol decreases serum phosphate levels in chronic hemodialysis patients]. *Nihon Jinzo Gakkai Shi* 40:1-7. <https://pubmed.ncbi.nlm.nih.gov/9513376>
20. Zeman M, Vecka M, Perlík F, et al. (2016) Pleiotropic effects of niacin: Current possibilities for its clinical use. *Acta Pharm*, 66:449-469. <https://pubmed.ncbi.nlm.nih.gov/27749252>
21. Zhang Y, Ma T, Zhang, P. (2018) Efficacy and safety of nicotinamide on phosphorus metabolism in hemodialysis patients: A systematic review and meta-analysis. *Medicine*, 97: e12731. <https://pubmed.ncbi.nlm.nih.gov/30313075>
22. Vasantha J, Soundararajan P, Vanitharani N, et al. (2011) Safety and efficacy of nicotinamide in the management of hyperphosphatemia in patients on hemodialysis. *Indian J Nephrol*. 21:245-249. <https://pubmed.ncbi.nlm.nih.gov/22022084>
23. Lenglet A, Liabeuf S, El Esper N, et al. (2017) Efficacy and safety of nicotinamide in haemodialysis patients: the NICOREN study. *Nephrol Dial Transplant*. 32:870-879. <https://pubmed.ncbi.nlm.nih.gov/27190329>
24. Liu X-Y, Yao J-R, Xu R, et al. (2020) Investigation of nicotinamide as more than an anti-phosphorus drug in chronic hemodialysis patients: a single-center, double-blind, randomized, placebo-controlled trial. *Ann Transl Med*. 8:530. <https://pubmed.ncbi.nlm.nih.gov/32411753>
25. El Borolossy R, El Wakeel LM, El Hakim I, Sabri, N. (2016) Efficacy and safety of nicotinamide in the management of hyperphosphatemia in pediatric patients on regular hemodialysis. *Pediatr Nephrol*. 31:289-296. <https://pubmed.ncbi.nlm.nih.gov/26420678>
26. Ketteler M, Wiecek A, Rosenkranz AR, et al. (2021) Efficacy and Safety of a Novel Nicotinamide Modified-Release Formulation in the Treatment of Refractory Hyperphosphatemia

Reversing Chronic Kidney Disease with Niacin and Sodium Bicarbonate

References

- in Patients Receiving Hemodialysis--A Randomized Clinical Trial. *Kidney Int Rep.* 6:594-604. <https://pubmed.ncbi.nlm.nih.gov/33732974>
27. Raines NH, Ganatra S, Nissaisorakarn P, et al. (2021) Niacinamide May Be Associated with Improved Outcomes in COVID-19-Related Acute Kidney Injury: An Observational Study. *Am Soc of Nephrol. Kidney360.* <https://kidney360.asnjournals.org/content/2/1/33>.
28. Takahashi Y, Tanaka A, Nakamura T, et al. (2004) Nicotinamide suppresses hyperphosphatemia in hemodialysis patients. *Kidney International.* 65:1099-1104. [https://www.kidney-international.org/article/S0085-2538\(15\)49804-7/fulltext](https://www.kidney-international.org/article/S0085-2538(15)49804-7/fulltext).
29. Sampathkumar K (2016) Niacin for phosphate control: A case of David versus Goliath. *Indian J Nephrol.* 26:237-238. <https://pubmed.ncbi.nlm.nih.gov/27510758>
30. Sampathkumar K, Selvam M, Sooraj YS, et al. (2006) Extended release nicotinic acid - a novel oral agent for phosphate control. *Int Urol Nephrol* 38:171-174. <https://pubmed.ncbi.nlm.nih.gov/16502077>
31. Edalat-Nejad M, Zameni F, Talaiei A. (2012) The effect of niacin on serum phosphorus levels in dialysis patients. *Indian J Nephrol* 22:174-178 . <https://pubmed.ncbi.nlm.nih.gov/23087550>
32. Shin S, Lee S. (2014) Niacin as a drug repositioning candidate for hyperphosphatemia management in dialysis patients. *Ther Clin Risk Manag.* 10:875-883. <https://pubmed.ncbi.nlm.nih.gov/25342908>
33. Zahed NS, Zamanifar N, Nikbakht H. (2016) Effect of low dose nicotinic acid on hyperphosphatemia in patients with end stage renal disease. *Indian J Nephrol* 26:239-243. <https://pubmed.ncbi.nlm.nih.gov/27512294>
34. Ralto KM, Rhee EP, Parikh SM. (2020) NAD+ homeostasis in renal health and disease. *Nat Rev Nephrol.* 16:99-111. <https://pubmed.ncbi.nlm.nih.gov/31673160>
35. Palmer BF, Alpern RJ. (2003) Treating dyslipidemia to slow the progression of chronic renal failure. *Am J Med.* 114:411-412 (2003). <https://pubmed.ncbi.nlm.nih.gov/12714133>
36. Cho K, Kim H, Rodriguez-Iturbe B, Vaziri ND. (2009) Niacin ameliorates oxidative stress, inflammation, proteinuria, and hypertension in rats with chronic renal failure. *American Journal of Physiology-Renal Physiology* 297:F106-F113. <https://pubmed.ncbi.nlm.nih.gov/19420110>
37. Owada A, Suda S, Hata T. (2003) Antiproteinuric effect of niceritrol, a nicotinic acid derivative, in chronic renal disease with hyperlipidemia: a randomized trial. *Am J Med* 114:347-353. <https://pubmed.ncbi.nlm.nih.gov/12714122>
38. Burge NJ. (2017) Association of Niacin on Phosphate Control in Advanced-Stage Chronic Kidney Disease Patients within a VA Population. <https://www.semanticscholar.org/paper/Association-of-Niacin-on-Phosphate-Control-in-a-VA-Burge/988840c5343630c2e2319a85b4c05b61ecf75362>.
39. Zhen X, Zhang S, Xie F, et al. (2021) Nicotinamide Supplementation Attenuates Renal Interstitial Fibrosis via Boosting the Activity of Sirtuins. *Kidney Dis (Basel)* 7:186-199. <https://pubmed.ncbi.nlm.nih.gov/34179114>
40. Müller D, Mehling H, Otto B, et al. (2007) Niacin lowers serum phosphate and increases HDL cholesterol in dialysis patients. *Clin J Am Soc Nephrol* 2:1249-1254. <https://pubmed.ncbi.nlm.nih.gov/17913971>
41. Liu D, Wang X, Kong L, Chen Z. (2014) Nicotinic Acid Regulates Glucose and Lipid Metabolism Through Lipid Independent Pathways. *Curr Pharm Biotechnol.* 16:3-10. <https://pubmed.ncbi.nlm.nih.gov/25429652>

Reversing Chronic Kidney Disease with Niacin and Sodium Bicarbonate

References

42. Small C, Kramer HJ, Griffin KA, et al. (2017) Non-dialysis dependent chronic kidney disease is associated with high total and out-of-pocket healthcare expenditures. BMC Nephrol 18:3. <https://pubmed.ncbi.nlm.nih.gov/28056852>
43. Golestaneh L, Alvarez PJ, Reaven NL, et al. (2017) All-cause costs increase exponentially with increased chronic kidney disease stage. Am J Manag Care 23:S163-S172. <https://pubmed.ncbi.nlm.nih.gov/28978205>
44. Dharnidharka, V. R., Kwon, C. & Stevens, G. (2002) Serum cystatin C is superior to serum creatinine as a marker of kidney function: a meta-analysis. Am J Kidney Dis. 40:221-226. <https://pubmed.ncbi.nlm.nih.gov/12148093>
45. Grubb A. (2017) Cystatin C is Indispensable for Evaluation of Kidney Disease. EJIFCC 28:268-276 . <https://pubmed.ncbi.nlm.nih.gov/29333146>
46. Finn WF (1961-2011) PubMed, see: <https://pubmed.ncbi.nlm.nih.gov/?term=finn+wf>
47. Shang D, Xie Q, Ge X, et al. (2015) Hyperphosphatemia as an independent risk factor for coronary artery calcification progression in peritoneal dialysis patients. BMC Nephrol 16:107. <https://pubmed.ncbi.nlm.nih.gov/26187601>
48. Felsenfeld AJ, Levine BS, Rodriguez M. (2015) Pathophysiology of Calcium, Phosphorus, and Magnesium Dysregulation in Chronic Kidney Disease. Semin Dial 28:564-577. <https://pubmed.ncbi.nlm.nih.gov/26303319>
49. Monckeberg's arteriosclerosis. Wikipedia (2020). https://en.wikipedia.org/wiki/Monckeberg%27s_arteriosclerosis
50. de Brito-Ashurst, I, Varaganam M, Raftery MJ, Yaqoob MM. (2009) Bicarbonate supplementation slows progression of CKD and improves nutritional status. J Am Soc Nephrol 20:2075-2084. <https://pubmed.ncbi.nlm.nih.gov/19608703>
51. Brauser D (2010) Baking Soda May Slow Progression of Chronic Kidney Disease. Medscape. <http://www.medscape.com/viewarticle/706043>.
52. Kumakura S, Sato E, Sekimoto A, et al. (2021) Nicotinamide Attenuates the Progression of Renal Failure in a Mouse Model of Adenine-Induced Chronic Kidney Disease. Toxins (Basel) 13:50. <https://pubmed.ncbi.nlm.nih.gov/33440677>
53. Hussain S.Singh A, Alshammari TM, et al. (2020) Nicotinamide Therapy in Dialysis Patients: A Systematic Review of Randomized Controlled Trials. Saudi J Kidney Dis Transpl 31:883-897. <https://pubmed.ncbi.nlm.nih.gov/33229753>
54. He YM, Feng L, Huo D-M, Yang Z-H, Liao Y-H. (2014) Benefits and harm of niacin and its analog for renal dialysis patients: a systematic review and meta-analysis. Int Urol Nephrol 46:433-442. <https://pubmed.ncbi.nlm.nih.gov/24114284>
55. Faivre A, Katsyuba E, Verissimo T, et al. (2021) Differential role of nicotinamide adenine dinucleotide deficiency in acute and chronic kidney disease. Nephrol Dial Transplant 36, 60-68 . <https://pubmed.ncbi.nlm.nih.gov/33099633>
56. Hasegawa, K. (2019)cNovel tubular--glomerular interplay in diabetic kidney disease mediated by sirtuin 1, nicotinamide mononucleotide, and nicotinamide adenine dinucleotide Oshima Award Address 2017. Clin Exper Nephrol 23:987-994. <https://pubmed.ncbi.nlm.nih.gov/30859351>
57. Hasegawa, K. Wakino S, Sakamaki Y, et al. (2016) Communication from Tubular Epithelial Cells to Podocytes through Sirt1 and Nicotinic Acid Metabolism. Curr Hypertens Rev 12:95-104. <https://pubmed.ncbi.nlm.nih.gov/26931474>

Reversing Chronic Kidney Disease with Niacin and Sodium Bicarbonate

References

58. Ilkhani F, Hosseini B, Saedisomeolia A (2016) Niacin and Oxidative Stress: A Mini-Review. J Nutri Med Diet Care. 2:014. <https://clinmedjournals.org/articles/jnm/journal-of-nutritional-medicine-and-diet-care-jnm-2-014.php>
59. Lenglet A, Liabeuf S, Guffroy P, et al. (2013) Use of Nicotinamide to Treat Hyperphosphatemia in Dialysis Patients. Drugs R D 13:165-173. <https://pubmed.ncbi.nlm.nih.gov/24000048>
60. Matthews DR, Hosker JP, Rudenski AS, et al. (1985) Homeostasis model assessment: insulin resistance and beta-cell function from fasting plasma glucose and insulin concentrations in man. Diabetologia, 28:412-419. <https://pubmed.ncbi.nlm.nih.gov/3899825>
61. Wallace TM, Levy JC, Matthews DR (2004) Use and abuse of HOMA modeling Diabetes Care 27:1487-1495. <https://pubmed.ncbi.nlm.nih.gov/15161807>
62. Editorial (2018) Making more of multimorbidity: an emerging priority. The Lancet. 391:1637 [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)30941-3/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)30941-3/fulltext).
63. Arias E, Heron M, Tejada-Vera B. (2013) United States life tables eliminating certain causes of death, 1999-2001. Natl Vital Stat Rep 61:1-128. <https://pubmed.ncbi.nlm.nih.gov/24968617>
64. Canner PL, Berge KG, Wenger NK, et al. (1986) Fifteen year mortality in Coronary Drug Project patients: long-term benefit with niacin. J Am Coll Cardiol 8:1245-1255. <https://pubmed.ncbi.nlm.nih.gov/3782631>

Orthomolecular Medicine News Service free subscription link <http://orthomolecular.org/subscribe.html> and the OMNS archive link <http://orthomolecular.org/resources/omns/index.shtml>

Brush. Floss. OraMax™
A dissolving probiotic tablet for a healthy oral microbiome.*

*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.

Townsend Letter .. for Doctors .. for Patients .. For All
Working with 'you' for almost 40 years, but we can't do it without your help!

Get Involved

Marie Abidin • Patch Adams • Gordon Ainslie • Majid Ali • Irene Allegor • Henry Allen • Robert Anderson • Nancy Appleton • Robert ... • Donald Brown • Mark Brudnak • Johanna Budwig • Graham Burdick • Stanislaw Burzynski • Harold Buttram • Charles ... • Chantal Cabrera • Nicholas Collins • Joseph Campbell • Bill Capodonna • Donald Carmo • John Carroll • H.R.

TownsendLetter.com/get-involved