

Annotated Bibliography

Cichocki, M. (2009). *Living with HIV: A Patient's Guide (Revised ed.)*. North Carolina, USA: McFarland. Mark Cichocki is currently an HIV/AIDS Registered Nurse at the University of Michigan HIV/AIDS Treatment Program. He has been caring for people living with HIV for over 10 years now. This guide offers a wealth of information for people who have been diagnosed with HIV and for individuals caring for HIV positive friends and loved ones. Valuable tips aid the reader in making the best decision when choosing a doctor, selecting and adhering to the right medication routine. Mark Cichocki points out that our bodies are made up of trillions of cells which need energy to carry on cellular functions. This energy is produced by the body during glucose metabolism. The findings from this book suggest that this process occurs in the “power plant” of our cells called the mitochondria. In normal healthy cells, the mitochondria produce the energy each cell needs every second of every day. This process produces lactic acid as a byproduct and eliminated as waste from the body. However, in instances where the mitochondria have been damaged for some reason, the lactic acid accumulates in the cells and in the blood streams. In the case of people living with HIV, experts have seen accumulation of lactic acid in association with the class of HIV medications known as Nucleoside Reverse Transcriptase Inhibitors (NRTIs). In order to produce energy for the cell, the mitochondria needs specific enzymes produced naturally in the body. NRTIs interfere with one of these enzymes, interrupting the mitochondria’s ability to produce cellular energy and carry on cellular functions. One of these cellular functions removes lactic acid from the cell. If the cell loses the ability, lactic acid builds up to toxic levels within the cell.

Flaws, B., Kuchinski, L. M., & Casañas, R. (2002). *The treatment of diabetes mellitus with Chinese medicine (illustrated ed.)*. London, UK: Blue Poppy Enterprises, Inc. Beginning his study of Chinese medicine in 1977, Bob Flaws has since become one of the best-known authors, English-language teachers and practitioners of Chinese medicine. He is a champion of both the model and process of Chinese medicine and has written translated and published more than 80 books and numerous articles on the subject. Dr. Casañas is a Board Certified Pain Management specialist and Board Certified Internist who owned and directed three medical clinics in northern California for the last two decades. Dr. Casañas completed his training at Washington University in St. Louis and also trained at UCLA in Medical Acupuncture. He has also worked as an assistant clinical professor at the University of California San Francisco in addition to becoming involved as a national presenter and speaker at renowned medical conventions. These authors point out that the buildup of lactic acid can be caused by impaired utilization of the acid by the liver and kidneys due to hepatic failure, alcohol, and malignancy or due to biguanide hypoglycemic agents in diabetic patients. Metformin, a first-line drug for the treatment of type 2 diabetes, results in a buildup of lactic acid due to an inability to clear it from the system. Lactic acid buildup occurs very rarely though, only once in every

30,000 person. The second part of the research question gains significantly from these findings.

McMillan, G. (2008). Leg it out. *Running Times* (355), 12. Greg McMillan is a runner, an exercise scientist as well as coach who has the distinctive capability of combining the science of endurance performance with the art of real-world coaching. He has a master's degree in Exercise Physiology. McMillan continues to relate advances in sports science to his training programs and has been a student of the sport since he started running in high school. From his expertise in training, McMillan suggests that the best way to return the levels of lactic acid to normal is to decrease the rate and intensity of exercise. The levels of Lactic acid decrease much more rapidly with slow exercise, like walking, than with no activity at all. Adequate "cool down" after engaging in strenuous exercise is also beneficial. He also suggests that taking regular rest periods, particularly when lifting heavy weights is essential in allowing the body to replenish its oxygen supply. From this source, we derive that varying the intensity of exercise or alternating between a number of exercises from day to day reduces the buildup of lactic acid. We also find out the importance of resting between reps, taking deep breaths and correctly cooling down after every exercise session in order to regulate the formation of lactic acid.

Mork, R. (2009, June 8). Lactic Acid Build Up in Muscle. North Carolina, North Carolina, USA. Rachel Mork is an expert author since August 24, 2008 and has 57 published articles on EzineArticles.com. In this article, she explains how lactic acid is formed in the muscle cells during strenuous activities. She also states ways to relieve symptoms of lactic acid build up. In her opinion, drinking plenty of water helps to flush the body of excess lactic acid. She also recommends stretching after exercising which allows the muscles to release some of the lactic acid building up in the muscles. This author agrees with Greg Macmillan on a number of issues including the fact that varying the intensity of exercise or alternating different exercises reduces the buildup of lactic acid. This two sources attempt to give an answer to the second part of the research problem which seeks to find strategies of preventing lactic acid buildup.

O'Keefe, J. H., Bell, D. S., & Wy, K. L. (2008). *Diabetes essentials* (3 ed.). Massachusetts, USA: Jones & Bartlett Learning. James H. O'Keefe is Director of Preventive Cardiology at the Mid America Heart Institute, as well as Professor of Medicine at the University of Missouri-Kansas City. His postgraduate training included a cardiology fellowship at Mayo Clinic in Minnesota. Dr. O'Keefe has contributed over 180 articles to the medical literature in addition to authoring numerous books. David S. Bell is one of the world's leading experts on ME/CFS, and is a pioneer in its diagnosis and treatment. He has taught at Harvard Medical School, and is a former staff member of Cambridge Hospital. Presently, he runs a private family practice in Lyndonville where he sees ME/CFS patients but maintains a particular interest in children with the illness. These authors point out that buildup of lactic acid is a rare but serious metabolic complication that can arise due to the use of metformin. It mostly occurs in older people who have other major health problem, particularly one that may impair circulation or breathing. From the

findings of these authors, drinking alcohol whilst taking metformin may also trigger a buildup of lactic acid when other health risks are present. The authors basically agree with Bob Flaws, Lynn M. Kuchinski and Robert Casañas concerning the link between metformin and the buildup of lactic acid.

Pribram, V. (2010). *Nutrition and HIV (Revised ed.)*. New Jersey, USA: John Wiley and Sons. Vivian Pibram is an advanced (HIV) Dietitian at King's College Hospital, London, UK. He brings together the latest research to offer practicing dietitians and nutritionists with a useful guide to the nutritional care of the HIV patient. Students as well as other health care professionals studying and working in this area will also find this book an important and valuable resource. Vivian Pibram is of the same opinion as Mark Cichocki that NRTIs results in the buildup of lactic acid. In addition he points out that the use of d4Ts and AZT (both HIV drugs) used in combinations results in this build up. Vivian Pibram states that raised lactic acid as a result of ART is a potentially life-threatening condition requiring the immediate withdrawal of ART and any other contributory agents. These findings relate to my research problem in that it gives a cause of lactic acid build-up and also suggest ways of how to prevent this buildup particularly in HIV patients.

Rector-Page, L. (1998). *How to be your own herbal pharmacist: herbal traditions - expert formulations (2, illustrated ed.)*. Illinois, USA: Healthy Healing, Inc. Linda Rector-Page has had a career in natural health for almost three decades. This is one of her bestselling books and is used as a textbook at higher educational institutions. She holds degrees in Holistic Nutrition and Naturopathy from Clayton College of Natural Health. In this book, Linda illustrates how to combine herbs to tackle all aspects of specific ailments. She has been saying for years that good food is good medicine. She presents the latest information about how to use food as medicine, for wellness and for healing. In her research, safflower, also known as *Carthamus tinctorius*, can be used as part of a sports formula to reduce lactic acid build up. Another herb that can be used for a similar purpose according to Linda is Saffron (*Crocus sativus*). These findings are relevant to the second part of the research problem which is to find strategies of preventing the buildup of lactic acid.

Ritchason, J. (1995). *The Little Herb Encyclopedia (illustrated ed.)*. London, UK: Woodland Publishing. Jack Ritchason received his degree in naturopathic medicine from Arizona College of Naturopathic Medicine and his Ph.D. in Nutrition from Donsbach University, California. He received his degree in Homeopathy from Missouri and Florida and got his training in Iridology from Dr. Bernard Jensen in California. He is a Registered Healthologist in addition to being a Certified Instructor for Touch For Health. Dr. Ritchason has been in the field of health since 1963 and is regarded as a master in the field of Iridology and Herbology. From his expertise in Naturopathic Medicine, Dr. Ritchason agrees with Linda Rector-Page that both safflower and saffron can be used to reduce lactic acid build up. He says that the two herbs can be used interchangeably although safflower is much more available than Saffron and hence more widely used. This finding is a reinforcement of the findings from

Linda Rector-Page's book and therefore gives additional credibility to the findings.

- Rosdahl, C. B., & Kowalski, M. T. (2007). *Textbook of basic nursing (9, illustrated ed.)*. Philadelphia, USA: Lippincott Williams & Wilkins.** Caroline Bunker Rosdahl began her career as a Nursing Assistant while she was still a teenager in a small 50-bed hospital. Ms. Rosdahl holds an Associate in Liberal Arts Degree in addition to a Bachelor of Science in nursing degree from the University of Minnesota. Her graduate work includes a Master of Arts Degree in Psychology and Education as well as completion of course work for a PhD in Education. Mary T. Kowalski on the other hand started her nursing career working as a nurse aide whilst attending nursing school. Nursing has been her commitment and passion for over 30 years and for the last 20 years she has been teaching theory as well as clinical aspects of nursing to student vocational/practical nurses. This comprehensive textbook covers the entire Licensed Practical and Licensed Vocational Nurses curriculum. It covers anatomy and physiology, growth and development, nursing process, nursing skills and pharmacology, among other key areas. The intended audience of this book is nursing students at all levels. In chapter 18 of this book, the authors talk about the musculoskeletal system which includes the skeleton, joints, ligaments, muscles and tendons. They explain how lactic acid is formed in muscle cells as a waste product of the oxidation process. We learn from these authors that the build-up of lactic acid is caused by vigorous or prolonged muscle action. They also talk about shock as cause of lactic acid build-up. With nursing careers that span several decades and immense experience of these two authors, their findings are important to my research of finding the causes of lactic acid build-up.
- Shils, M. E., & Shike, M. (2006). *Modern nutrition in health and disease (10, illustrated ed.)*. Philadelphia, USA: Lippincott Williams & Wilkins.** Moshe Shike graduated from Tel Aviv University School of Medicine in 1974, and successfully completed his residency in Internal Medicine at the Harvard School of Medicine besides a fellowship in Gastroenterology and Nutrition at the University of Toronto. He is a professor of medicine at Cornell University Medical College and an attending physician at Memorial Sloan-Kettering Cancer Center. He is a former director of the Cancer Prevention and Wellness Program at MSKCC, which was established in 1999. This extensively acclaimed book is an absolute, dependable reference on nutrition and its role in modern medicine, nursing, dietetics, public health, and public policy. The authors offer coverage of the role of nutrition in disease prevention, public health concerns, international nutrition issues and areas of key scientific progress that relate nutrition to disease. This book is intended for the general public since it addresses fundamental health issues which can benefit anyone who reads it. The authors of this book bring to our attention another cause of lactic acid build-up which is acute alcoholism and liver disease. Normally, lactic acid is produced by the extra hepatic tissue and is metabolized by the liver. In the event that the liver is not functioning properly, lactic acid builds up

on the muscles. This book talks about a different cause of lactic acid build-up from the other sources and therefore advances my research.