

Antibiotics in Early Life: Dysbiosis and Damage Done

Miss. Aishwarya Ubale¹, Miss. Samruddhi Khude², Mrs. Archana Binage³

B. Pharm^{1,2} and M. Pharm³

College of Pharmacy, Paniv, Malshiras, Solapur, Maharashtra, India

Abstract: Antibiotic are the most common type of medication prescribed to children, including infants, in western world. Antibiotics alter the gut microbial composition. Since the gut microbiota plays crucial role in immunity, metabolism and endocrinology the effects of antibiotics on the microbiota may lead to further health complications. Antibiotic in childhood have been linked with disease including asthma, juvenile, arthritis, type 1 diabetes, chronic disease and mental illness. In COVID-19 probiotics plays a therapeutic role for GI, IBD, colitis, and even in viral infection. So, we assume that the inclusion of studies to investigate gut microbiome and subsequent therapies such as probiotic might help decrease the inflammatory response of viral pathogenesis and respiratory symptoms by strengthening the host immune system, amelioration of gut microbiome, and improvement of gut barrier function. Focused on four types of dysbiosis loss of keystone taxa, loss of diversity. Establishment of large and diverse baseline healthy infant microbiome development is essential to advancing diagnosis interpretation and eventual treatment pediatric dysbiosis. In this review we present an overview of effects of antibiotics on microbiome in children and correlate them to long lasting complications.

Objectives:

- To review on antibiotics are alter the gut microbial composition in children, adult.
- To review on gut microbiota plays crucial roles in immunity, metabolism and endocrinology, the effects of antibiotics on microbiota may lead to further health..

Keywords: Infants, gut microbiota, metabolism, endocrinology, diabetes, inflammatory response, pediatric dysbiosis, microbiome

REFERENCES

- [1]. Medically Reviewed by Sabrina Felson, MD on November 03, 2019.
- [2]. Krzysztof Czaja, Brent Gaway (2017) Broad-Spectrum Antibiotic Abuse and its Connection to Obesity. J Nutrition Health Food Sci 5(4):1-21. DOI: <http://dx.doi.org/10.15226/jnhfs.2017.001102>.
- [3]. Reviewed by: Kate M. Cronan, MD.
- [4]. <https://www.google.com/url?sa=t&source=web&rct=j&url=https://theconversation.com/antibiotics-before-birth-and-in-early-life-can-affect-long-term-health-97778&ved=2ahUKEwj38rLdnIjxAhU9zDgGHR96Ca0QFjATegQIChAC&usg=AOvVaw19-f5ZMG64dqWTjeEZXcin&cf=1>.
- [5]. https://www.google.com/url?sa=t&source=web&rct=j&url=https://cdhf.ca/health-lifestyle/dysbiosis-ibs/&ved=2ahUKEwi_49zom4jxAhVIU30KHXXGBkg4HhAWMA6BAgCEAI&usg=AOvVaw2fj6fZ5_KRaCWR27ilGKNw.
- [6]. Hadar Neuman, Paul Forsythe, Atara Uzan, Orly Avni, Omry Koren
- [7]. FEMS Microbiology Reviews, Volume 42, Issue 4, July 2018, Pages 489–499, <https://doi.org/10.1093/femsre/fuy018>.
- [8]. Korpela K, Salonen A, Virta LJ et al. Lactobacillus rhamnosus GG intake modifies preschool children's intestinal microbiota, alleviates penicillin-associated changes, and reduces antibiotic use. PLoS One 2016b;11:e0154012.
- [9]. Leclercq S, Mian FM, Stanisz AM et al. Low-dose penicillin in early life induces long-term changes in murine gut microbiota, brain cytokines and behavior. Nat Comms 2017;8:15062.

- [10]. Pajau Vangay, Tonya Ward, Jeffrey S. Gerber, and Dan Knights^{2,4,*}Cell Host Microbe. 2015 May 13; 17(5): 553–564. doi:10.1016/j.chom.2015.04.006.
- [11]. Theocharis Konstantinidis, Christina Tsigalou, Alexandros Karvelas, Elisavet Stavropoulou, Chrissoula Voidarou³ and Eugenia Effects of Antibiotics upon the Gut Microbiome:A Review of the Literature.
- [12]. Brigitte Dréno, Marie Ange Dagnelie, Amir Khammari Stéphane Corvec American Journal of Clinical Dermatology (2020) 21 (Suppl 1):S18–S24 <https://doi.org/10.1007/s40257-020-00531-1>.
- [13]. Medically reviewed by Saurabh Sethi, M.D., MPH — Written by Tim Jewell — Updated on February 1, 2019.
- [14]. Ahmad Ud Din a, Maryam Mazhar b, Muhammed Waseem c, Waqar Ahmad d,a, Asma Bibi e, Adil Hassan f, Niaz Ali g, Wang Gang a, Gao Qian a, Razi Ullah f, Tariq Shah h, Mehraj Ullah i, Israr Khan j, Muhammad Farrukh Nisar k, Jianbo Wu a, journal homepage: www.elsevier.com/locate/biopha.
- [15]. https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/6_TK1_T5-Suspect_a_Urinary_Tract_Infection_brochure_MA_Coalition_final.pdf&ved=2ahUKEwjwrrC4nYjxAhVmyjgGHS-GCIYQFjASegQIDhAC&usg=AOvVaw1kHMsRKJfi8bGkdLxLCGcU.
- [16]. Lamont J. Wilkins, Manoj Monga & Aaron W. Miller, Dysbiosis for a Cluster of Chronic Diseases To link this article: www.nature.com/scientificreports.
- [17]. Medically reviewed by Leigh Ann Anderson, PharmD. Last updated on July 15, 2019.
- [18]. Medically Reviewed by Urgent Care January 8, 2016.
- [19]. Written by Julia Ries on September 24, 2018.
- [20]. Lucy McDonnell, Alexander Gilkes, Mark Ashworth, Victoria Rowland, Timothy Hugh Harries, David Armstrong & Patrick White (2021) Association between antibiotics and gut microbiome dysbiosis in children: systematic review and meta-analysis, Gut Microbes, 13:1, 1-18, DOI: 10.1080/19490976.2020.1870402 To link to this article: <https://doi.org/10.1080/19490976.2020.1870402>.
- [21]. Manuel Ferrer a, Celia Méndez-García b, David Rojo c, Coral Barbas c, Andrés Moya d,e,f, journal homepage: www.elsevier.com/locate/biochempharm.
- [22]. Medically Reviewed by Michael Gabay, PharmD, JD, BCPS, FCCP This page features 21 Cited Research Articles.
- [23]. Medically Reviewed by Sabrina Felson, MD on November 03, 2019(WebMed).
- [24]. Roubaud-Baudron C, Ruiz VE, Swan AM, Jr, Vallance BA, Ozkul C, Pei Z, Li J, Battaglia TW, Perez-Perez GI, Blaser MJ. 2019. Long-term effects of early- life antibiotic exposure on resistance to subsequent bacterial infection. mBio 10:e02820-19. <https://doi.org/10.1128/mBio.02820-19>.
- [25]. Gasparrini, A. J. et al. Persistent metagenomic signatures of early-life hospitalization and antibiotic treatment in the infant gut microbiota and resistome. Nat. Microbiol. <https://doi.org/10.1038/s41564-019-0550-2>.(2019)
- [26]. Eck A, Rutten NBMM, Singendonk MMJ, Rijkers GT, Savelkoul PHM, Meijssen CB, et al. (2020) Neonatal microbiota development and the effect of early life antibiotics are determined by two distinct settler types. PLoS ONE 15(2): e0228133. <https://doi.org/10.1371/journal.pone.0228133>.
- [27]. <https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.nhs.uk/conditions/antibiotics/side-effects/&ved=2ahUKEwji5sLYnYjxAhV1xDgGHc7TADAQFjABegQIBBAF&usg=AOvVaw02Uzl9jhyKYH269IH0kToW>.
- [28]. Article Written by Julia Ries on September 24, 2018.
- [29]. Claire Roubaud-Baudrona,b,c, Victoria E. Ruizc,d, Alexander M. Swan Jr.c, Bruce A. Vallancee, Ceren Ozkulc,f, Zhiheng Peig, Jackie Lic, Thomas W. Battagliac, Guillermo I. Perez-Perezc, Martin J. Blaser <https://orcid.org/0000-0003-2447-2443>,h <https://doi.org/10.1128/mBio.02820-19>.