

REFERENCES

- Abaza, S., Rayan, H., Soliman, R., Nemr, N., & Mokhtar, A. (2014). Subtype analysis of *Blastocystis* spp. isolates from symptomatic and asymptomatic patients in Suez Canal University Hospitals, Ismailia, Egypt. *Parasitologists United Journal*, 7(1), 56. <https://doi.org/10.4103/1687-7942.139691>
- Abdelsalam, N. A., Hegazy, S. M., & Aziz, R. K. (2023). The curious case of *Prevotella copri*. *Gut Microbes*, 15(2). <https://doi.org/10.1080/19490976.2023.2249152>
- Abdul Rahim, M. B. H., Chilloux, J., Martinez-Gili, L., Neves, A. L., Myridakis, A., Gooderham, N., & Dumas, M. E. (2019). Diet-induced metabolic changes of the human gut microbiome: importance of short-chain fatty acids, methylamines and indoles. *Acta Diabetologica*, 56(5), 493–500. <https://doi.org/10.1007/s00592-019-01312-x>
- Abe, N. (2004). Molecular and phylogenetic analysis of *Blastocystis* isolates from various hosts. *Veterinary Parasitology*, 120(3), 235–242. <https://doi.org/10.1016/j.vetpar.2004.01.003>
- Adachi, K., Sugiyama, T., Yamaguchi, Y., Tamura, Y., Izawa, S., Hijikata, Y., Ebi, M., Funaki, Y., Ogasawara, N., Goto, C., Sasaki, M., & Kasugai, K. (2019). Gut microbiota disorders cause type 2 diabetes mellitus and homeostatic disturbances in gutrelated metabolism in Japanese subjects. *Journal of Clinical Biochemistry and Nutrition*, 64(3), 231–238. <https://doi.org/10.3164/jcbn.18-101>
- Aggarwal, N., Kitano, S., Puah, G. R. Y., Kittelmann, S., Hwang, I. Y., & Chang, M. W. (2023). Microbiome and Human Health: Current Understanding, Engineering, and Enabling Technologies. *Chemical Reviews*, 123(1), 31–72. <https://doi.org/10.1021/acs.chemrev.2c00431>
- Ajjampur, S. S. R., & Tan, K. S. W. (2016). Pathogenic mechanisms in *Blastocystis* spp. — Interpreting results from in vitro and in vivo studies. *Parasitology International*, 65(6), 772–779. <https://doi.org/10.1016/j.parint.2016.05.007>
- Akhtar, S., Nasir, J. A., Ali, A., Asghar, M., Majeed, R., & Sarwar, A. (2022). Prevalence of type-2 diabetes and prediabetes in Malaysia: A systematic review and meta-analysis. *PLoS ONE*, 17(1 January), 1–14. <https://doi.org/10.1371/journal.pone.0263139>
- Al-Jawabreh, A., Ereqat, S., Dumaidi, K., Al-Jawabreh, H., Abdeen, Z., & Nasereddin, A. (2019). Prevalence of selected intestinal protozoan infections in marginalized rural communities in Palestine. *BMC Public Health*, 19(1), 1–11. <https://doi.org/10.1186/s12889-019-8024-2>
- Ali, O. S., Mohammad, S. A., & Salman, Y. J. (2018). Incidence of Some Intestinal Parasites among Diabetic Patients Suffering from Gastroenteritis. *International Journal of Current Microbiology and Applied Sciences*, 7(08), 3695–3708.

<https://doi.org/10.20546/ijcmas.2018.708.375>

- Almugadam, B. S., Ibrahim, M. K., Liu, Y., Chen, S. min, Wang, C. hao, Shao, C. yi, Ren, B. wei, & Tang, L. (2021). Association of urogenital and intestinal parasitic infections with type 2 diabetes individuals: a comparative study. *BMC Infectious Diseases*, 21(1), 1–9. <https://doi.org/10.1186/s12879-020-05629-9>
- Almugadam, B. S., Liu, Y., Chen, S. M., Wang, C. H., Shao, C. Y., Ren, B. W., & Tang, L. (2020). Alterations of Gut Microbiota in Type 2 Diabetes Individuals and the Confounding Effect of Antidiabetic Agents. *Journal of Diabetes Research*, 2020. <https://doi.org/10.1155/2020/7253978>
- Alzate, J. F., Toro-Londoño, M., Cabarcas, F., Garcia-Montoya, G., & Galvan-Diaz, A. (2020). Contrasting microbiota profiles observed in children carrying either *Blastocystis* spp. or the commensal amoebas *Entamoeba coli* or *Endolimax nana*. *Scientific Reports*, 10(1), 1–11. <https://doi.org/10.1038/s41598-020-72286-y>
- Amabebe, E., Robert, F. O., Agbalalah, T., & Orubu, E. S. F. (2020). Microbial dysbiosis-induced obesity: Role of gut microbiota in homoeostasis of energy metabolism. *British Journal of Nutrition*, 123(10), 1127–1137. <https://doi.org/10.1017/S0007114520000380>
- Andersen, L. O. B., Bonde, I., Nielsen, H. B. H. B., & Stensvold, C. R. (2015). A retrospective metagenomics approach to studying *Blastocystis*. *FEMS Microbiology Ecology*, 91(7), 1–9. <https://doi.org/10.1093/femsec/fiv072>
- Aourarh, S., Skali, H., Abainou, L., E, E. M., & Moutaj, R. (2020). Intestinal Parasites in the Diabetic Patient. *International Journal of Diabetes & Metabolic Disorders*, 5(1), 2018–2020. <https://doi.org/10.33140/ijdm.05.01.02>
- Arisue, N. (2002). *Phylogenetic Position of*. 49(1), 42–53.
- Arumugam, M., Raes, J., Pelletier, E., Le Paslier, D., Yamada, T., Mende, D. R., Fernandes, G. R., Tap, J., Bruls, T., Batto, J. M., Bertalan, M., Borruel, N., Casellas, F., Fernandez, L., Gautier, L., Hansen, T., Hattori, M., Hayashi, T., Kleerebezem, M., ... Bork, P. (2011). Enterotypes of the human gut microbiome. *Nature*, 473(7346), 174–180. <https://doi.org/10.1038/nature09944>
- Asghari, A., Zare, M., Hatam, G., Shahabi, S., Gholizadeh, F., & Motazedian, M. (2020). Molecular identification and subtypes distribution of *Blastocystis* sp. isolated from children and adolescent with cancer in Iran: evaluation of possible risk factors and clinical features. *Acta Parasitologica*, 65(2), 462–473. <https://doi.org/10.2478/s11686-020-00186-2>
- Asghari, Ali, Zare, M., Hatam, G., Shahabi, S., Gholizadeh, F., & Motazedian, M. (2020). Molecular identification and subtypes distribution of *Blastocystis* sp. isolated from children and adolescent with cancer in Iran: evaluation of possible risk factors and clinical features. *Acta Parasitologica*, 0123456789. <https://doi.org/10.2478/s11686-020-00186-2>

- Audebert, C., Even, G., Cian, A., Blastocystis Investigation Group, Loywick, A., Merlin, S., Viscogliosi, E., Chabé, M., El Safadi, D., Certad, G., Delhaes, L., Pereira, B., Nourrisson, C., Poirier, P., Wawrzyniak, I., Delbac, F., Morelle, C., Bastien, P., Lachaud, L., ... Rabodonirina, M. (2016). Colonization with the enteric protozoa *Blastocystis* is associated with increased diversity of human gut bacterial microbiota. *Scientific Reports*, 6(May), 1–11. <https://doi.org/10.1038/srep25255>
- Audebert, C., Even, G., Cian, A., Investigation, T. B., Loywick, A., Merlin, S., Viscogliosi, E., & Chabé, M. (2016). Colonization with the enteric protozoa *Blastocystis* is associated with increased diversity of human gut bacterial microbiota. *Nature Publishing Group*, April, 1–11. <https://doi.org/10.1038/srep25255>
- Aykur, M. (2024). *Blastocystis*: A Mysterious Member of the Gut Microbiome. *Blastocystis: A Mysterious Member of the Gut Microbiome*. February. <https://doi.org/10.3390/microorganisms12030461>
- Bahrami, F., Haghighi, A., Zamini, G., Khadem-Erfan, M. B., & Azargashb, E. (2018). Prevalence and associated risk factors of intestinal parasitic infections in Kurdistan province, northwest Iran. *Cogent Medicine*, 5(1), 1–14. <https://doi.org/10.1080/2331205x.2018.1503777>
- Barçın Öztürk, Ş., Malatyali, E., Yıldız, İ., Tileklioglu, E., Ertabaklar, H., & Ertuğ, S. (2023). The Investigation of *Blastocystis* Subtypes in Fecal Samples of Diabetes Mellitus Patients. *Meandros Medical and Dental Journal*, 24(2), 175–179. <https://doi.org/10.4274/meandros.galenos.2023.24264>
- Bedarf, J. R., Hildebrand, F., Coelho, L. P., Sunagawa, S., Bahram, M., Goeser, F., Bork, P., & Wüllner, U. (2017). Functional implications of microbial and viral gut metagenome changes in early stage L-DOPA-naïve Parkinson's disease patients. *Genome Medicine*, 9(1), 1–13. <https://doi.org/10.1186/s13073-017-0428-y>
- Bednarska, M., Jankowska, I., Pawelas, A., Piwczynska, K., Bajer, A., Wolska-Kuśnierz, B., Wielopolska, M., & Welc-Falęciak, R. (2018). Prevalence of *Cryptosporidium*, *Blastocystis*, and other opportunistic infections in patients with primary and acquired immunodeficiency. *Parasitology Research*, 117(9), 2869–2879. <https://doi.org/10.1007/s00436-018-5976-6>
- Beiromvand, M., Hashemi, S. J., Arjmand, R., Sadjadei, N., & Hardanipasand, L. (2017). Comparative prevalence of *Blastocystis* in patients with the irritable bowel syndrome and healthy individuals: A case control study. *Jundishapur Journal of Microbiology*, 10(6). <https://doi.org/10.5812/jjm.13572>
- Berbudi, A., Rahmadika, N., Tjahjadi, A. I., & Ruslami, R. (2019). Type 2 Diabetes and its Impact on the Immune System. *Current Diabetes Reviews*, 16(5), 442–449. <https://doi.org/10.2174/1573399815666191024085838>
- Beyhan, Y. E., & Yıldız, M. R. (2023). Microbiota and parasite relationship. *Diagnostic*

- Blaak, E. E., Canfora, E. E., Theis, S., Frost, G., Groen, A. K., Mithieux, G., Nauta, A., Scott, K., Stahl, B., van Harselaar, J., van Tol, R., Vaughan, E. E., & Verbeke, K. (2020). Short chain fatty acids in human gut and metabolic health. *Beneficial Microbes*, 11(5), 411–455. <https://doi.org/10.3920/BM2020.0057>
- Bolyen, E., Rideout, J. R., Dillon, M. R., Bokulich, N. A., Abnet, C. C., Al-Ghalith, G. A., Alexander, H., Alm, E. J., Arumugam, M., Asnicar, F., Bai, Y., Bisanz, J. E., Bittinger, K., Brejnrod, A., Brislawn, C. J., Brown, C. T., Callahan, B. J., Caraballo-Rodríguez, A. M., Chase, J., ... Caporaso, J. G. (2019). Reproducible, interactive, scalable and extensible microbiome data science using QIIME 2. *Nature Biotechnology*, 37(8), 852–857. <https://doi.org/10.1038/s41587-019-0209-9>
- Boreham, P. F. L., & Stenzel, D. J. (n.d.). *Blastocystis in Humans and Animals : Morphology , Biology , and Epizootiology* (Vol. 32).
- Cani, P. D., Bibiloni, R., Knauf, C., Neyrinck, A. M., & Delzenne, N. M. (2008). Changes in gut microbiota control metabolic diet-induced obesity and diabetes in mice. *Diabetes*, 57(6), 1470–1481. <https://doi.org/10.2337/db07-1403>.Additional
- Castañeda, S., Muñoz, M., Villamizar, X., Hernández, P. C., Vásquez, L. R., Tito, R. Y., & Ramírez, J. D. (2020). Microbiota characterization in *Blastocystis*-colonized and *Blastocystis*-free school-age children from Colombia. *Parasites and Vectors*, 13(1), 1–12. <https://doi.org/10.1186/s13071-020-04392-9>
- Cavalier-Smith T. (1998). A revised six-kingdom system of life. *Biological reviews of the Cambridge Philosophical Society*, 73(3), 203–266. <https://doi.org/10.1017/s0006323198005167>
- Certad, G., Viscogliosi, E., Chabé, M., & Cacciò, S. M. (2017). Pathogenic Mechanisms of *Cryptosporidium* and *Giardia*. *Trends in Parasitology*, 33(7), 561–576. <https://doi.org/10.1016/j.pt.2017.02.006>
- Chandramathi, S., Suresh, K., Sivanandam, S., & Kuppusamy, U. R. (2014). Stress exacerbates infectivity and pathogenicity of *Blastocystis hominis*: In vitro and in vivo evidences. *PLoS ONE*, 9(5), <https://doi.org/10.1371/journal.pone.0094567>
- Chávez-Carbajal, A., Pizano-Zarate, M. L., Hernández-Quiroz, F., Ortiz-Luna, G. F., Morales-Hernández, R. M., De Sales-Millán, A., Hernández-Trejo, M., García-Vite, A., Beltrán-Lagunes, L., Hoyo-Vadillo, C., & García-Mena, J. (2020). Characterization of the gut microbiota of individuals at different T2D stages reveals a complex relationship with the host. *Microorganisms*, 8(1). <https://doi.org/10.3390/microorganisms8010094>
- Clark, C. G. (1997). Extensive genetic diversity in *Blastocystis hominis*. *Molecular and Biochemical Parasitology*, 87(1), 79–83. <https://doi.org/10.1016/S0166->

- Clark, C. G., Giezen, M. Van Der, Alfellani, M. A., & Stensvold, C. R. (2013). Recent Developments in *Blastocystis* Research. In *BS:APAR* (Vol. 82). Elsevier. <https://doi.org/10.1016/B978-0-12-407706-5.00001-0>
- Craciun, C. I., Neag, M. A., Catinean, A., Mitre, A. O., Rusu, A., Bala, C., Roman, G., Buzoianu, A. D., Muntean, D. M., & Craciun, A. E. (2022). The Relationships between Gut Microbiota and Diabetes Mellitus, and Treatments for Diabetes Mellitus. *Biomedicines*, 10(2), 1–19. <https://doi.org/10.3390/biomedicines10020308>
- Crudele, L., Gadaleta, R. M., Cariello, M., & Moschetta, A. (2023). Gut microbiota in the pathogenesis and therapeutic approaches of diabetes. *EBioMedicine*, 97, 104821. <https://doi.org/10.1016/j.ebiom.2023.104821>
- Cunningham, A. L., Stephens, J. W., & Harris, D. A. (2021). Gut microbiota influence in type 2 diabetes mellitus (T2DM). *Gut Pathogens*, 13(1), 1–13. <https://doi.org/10.1186/s13099-021-00446-0>
- Darlan, D. M., Rozi, M. F., Nurangga, M. A., & Amsari, L. C. (2020). Cryptosporidium sp. And blastocystishominis findings: A cross-sectional study among healthy versus immunocompromised individuals. *International Journal of Psychosocial Rehabilitation*, 24(2), 2346–2351. <https://doi.org/10.37200/IJPR/V24I2/PR200530>
- Darwish, B., Aboualchamat, G., & Nahhas, S. Al. (2023). Molecular characterization of *Blastocystis* subtypes in symptomatic patients from the southern region of Syria. *PLoS ONE*, 18(3 March), 1–11. <https://doi.org/10.1371/journal.pone.0283291>
- Das, R., Khalil, S., Mirdha, B. R., Makharia, G. K., Dattagupta, S., & Chaudhry, R. (2016). Molecular characterization and subtyping of blastocystis species in irritable bowel syndrome patients from north India. *PLoS ONE*, 11(1), 1–9. <https://doi.org/10.1371/journal.pone.0147055>
- Das, T., Jayasudha, R., Chakravarthy, S. K., Prashanthi, G. S., Bhargava, A., Tyagi, M., Rani, P. K., Pappuru, R. R., Sharma, S., & Shivaji, S. (2021). Alterations in the gut bacterial microbiome in people with type 2 diabetes mellitus and diabetic retinopathy. *Scientific Reports*, 11(1), 1–15. <https://doi.org/10.1038/s41598-021-82538-0>
- De Filippo, C., Cavalieri, D., Di Paola, M., Ramazzotti, M., Poulet, J. B., Massart, S., Collini, S., Pieraccini, G., & Lionetti, P. (2010). Impact of diet in shaping gut microbiota revealed by a comparative study in children from Europe and rural Africa. *Proceedings of the National Academy of Sciences of the United States of America*, 107(33), 14691–14696. <https://doi.org/10.1073/pnas.1005963107>
- de Melo, G. B., Mazzaro, M. C., Gomes-Gouvêa, M. S., Dos Santos, É. A., de Souza, L. V., Elias-Oliveira, J., Gryschek, R. C. B., Rodrigues, R. M., & de Paula, F. M.

- (2021). *Blastocystis* subtypes in patients with diabetes mellitus from the midwest region of Brazil. *Revista Do Instituto de Medicina Tropical de Sao Paulo*, 63. <https://doi.org/10.1590/s1678-9946202163032>
- De Vadder, F., Kovatcheva-Datchary, P., Zitoun, C., Duchamp, A., Bäckhed, F., & Mithieux, G. (2016). Microbiota-Produced Succinate Improves Glucose Homeostasis via Intestinal Gluconeogenesis. *Cell Metabolism*, 24(1), 151–157. <https://doi.org/10.1016/j.cmet.2016.06.013>
- Defaye, M., Nourrisson, C., Baudu, E., Lashermes, A., Meynier, M., Meleine, M., Wawrzyniak, I., Bonnin, V., Barbier, J., Chassaing, B., Godfraind, C., Gelot, A., Barnich, N., Ardid, D., Bonnet, M., Delbac, F., Carvalho, F. A., & Poirier, P. (2020). Fecal dysbiosis associated with colonic hypersensitivity and behavioral alterations in chronically *Blastocystis*-infected rats. *Scientific Reports*, 10(1), 1–12. <https://doi.org/10.1038/s41598-020-66156-w>
- Delshad, A., Saraei, M., Alizadeh, S. A., Niaraki, S. R., Alipour, M., Hosseinbigi, B., Bozorgomid, A., & Hajialilo, E. (2020). Distribution and molecular analysis of *Blastocystis* subtypes from gastrointestinal symptomatic and asymptomatic patients in Iran. *African Health Sciences*, 20(3), 1179–1189. <https://doi.org/10.4314/ahs.v20i3.21>
- Deng, L., Lee, J. W. J., & Tan, K. S. W. (2022). Infection with pathogenic *Blastocystis* ST7 is associated with decreased bacterial diversity and altered gut microbiome profiles in diarrheal patients. *Parasites and Vectors*, 15(1), 1–9. <https://doi.org/10.1186/s13071-022-05435-z>
- Deng, L., Wojciech, L., Gascoigne, N. R. J., Peng, G., & Tan, K. S. W. (2021). New insights into the interactions between *Blastocystis*, the gut microbiota, and host immunity. *PLoS Pathogens*, 17(2), 1–15. <https://doi.org/10.1371/JOURNAL.PPAT.1009253>
- Deng, L., Wojciech, L., Png, C. W., Kioh, D. Y. Q., Gu, Y., Aung, T. T., Malleret, B., Chan, E. C. Y., Peng, G., Zhang, Y., Gascoigne, N. R. J., & Tan, K. S. W. (2023). Colonization with two different *Blastocystis* subtypes in DSS-induced colitis mice is associated with strikingly different microbiome and pathological features. *Theranostics*, 10(3), 1165–1179. <https://doi.org/10.7150/thno.81583>
- Deng, L., Wojciech, L., Png, C. W., Kioh, Y. Q. D., Ng, G. C., Chan, E. C. Y., Zhang, Y., Gascoigne, N. R. J., & Tan, K. S. W. (2023). Colonization with ubiquitous protist *Blastocystis* ST1 ameliorates DSS-induced colitis and promotes beneficial microbiota and immune outcomes. *Npj Biofilms and Microbiomes*, 9(1), 1–12. <https://doi.org/10.1038/s41522-023-00389-1>
- Deng, L., Wojciech, L., Png, C. W., Koh, E. Y., Aung, T. T., Kioh, D. Y. Q., Chan, E. C. Y., Malleret, B., Zhang, Y., Peng, G., Gascoigne, N. R. J., & Tan, K. S. W. (2022). Experimental colonization with *Blastocystis* ST4 is associated with protective immune responses and modulation of gut microbiome in a DSS-induced colitis mouse model. *Cellular and Molecular Life Sciences*, 79(5), 1–23.

<https://doi.org/10.1007/s00018-022-04271-9>

- Denoeud, F., Roussel, M., Noel, B., Wawrzyniak, I., Da Silva, C., Diogon, M., Viscogliosi, E., Brochier-Armanet, C., Couloux, A., Poulain, J., Segurens, B., Anthouard, V., Texier, C., Blot, N., Poirier, P., Ng, G. C., Tan, K. S. W., Artiguenave, F., Jaillon, O., ... El Alaoui, H. (2011). Genome sequence of the stramenopile *Blastocystis*, a human anaerobic parasite. *Genome Biology*, 12(3). <https://doi.org/10.1186/gb-2011-12-3-r29>
- Derrien, M., Alvarez, A. S., & de Vos, W. M. (2019). The Gut Microbiota in the First Decade of Life. *Trends in Microbiology*, 27(12), 997–1010. <https://doi.org/10.1016/j.tim.2019.08.001>
- Dinarello, C. A. (2011). Interleukin-1 in the pathogenesis and treatment of inflammatory diseases. *Blood*, 117(14), 3720–3732. <https://doi.org/10.1182/blood-2010-07-273417>
- Dogan, N., Aydin, M., Tuzemen, N. U., Dinleyici, E. C., Oguz, I., & Dogruman-Al, F. (2017). Subtype distribution of *Blastocystis* spp. isolated from children in Eskisehir, Turkey. *Parasitology International*, 66(1), 948–951. <https://doi.org/10.1016/J.PARINT.2016.10.008>
- Dong, Y., Wang, P., Yang, X., Chen, M., & Li, J. (2022). Potential of gut microbiota for lipopolysaccharide biosynthesis in European women with type 2 diabetes based on metagenome. *Frontiers in Cell and Developmental Biology*, 10(October), 1–14. <https://doi.org/10.3389/fcell.2022.1027413>
- Doumatey, A. P., Adeyemo, A., Zhou, J., Lei, L., Adebamowo, S. N., Adebamowo, C., & Rotimi, C. N. (2020). Gut Microbiome Profiles Are Associated With Type 2 Diabetes in Urban Africans. *Frontiers in Cellular and Infection Microbiology*, 10(February), 1–13. <https://doi.org/10.3389/fcimb.2020.00063>
- Dubik, M., Pilecki, B., & Moeller, J. B. (2022). Commensal Intestinal Protozoa—Underestimated Members of the Gut Microbial Community. *Biology*, 11(12), 1–17. <https://doi.org/10.3390/biology11121742>
- Egshatyan, L., Kashtanova, D., Popenko, A., Tkacheva, O., Tyakht, A., Alexeev, D., Karamnova, N., Kostryukova, E., Babenko, V., Vakhitova, M., & Boytsov, S. (2016). Gut microbiota and diet in patients with different glucose tolerance. *Endocrine Connections*, 5(1), 1–9. <https://doi.org/10.1530/EC-15-0094>
- Esteghamati, A., Khanaliha, K., Bokharaei-Salim, F., Sayyahfar, S., & Ghaderipour, M. (2019). Prevalence of intestinal parasitic infection in cancer, organ transplant and primary immunodeficiency patients in Tehran, Iran. *Asian Pacific Journal of Cancer Prevention*, 20(2), 495–501. <https://doi.org/10.31557/APJCP.2019.20.2.495>
- Fadaei, R., Bagheri, N., Heidarian, E., Nouri, A., Hesari, Z., Moradi, N., Ahmadi, A., & Ahmadi, R. (2020). Serum levels of IL-32 in patients with type 2 diabetes

- mellitus and its relationship with TNF- α and IL-6. *Cytokine*, 125(June 2019), 154832. <https://doi.org/10.1016/j.cyto.2019.154832>
- Fadl, H., Elsayed, N., Rehan, M., El-Gebaly, N., & Abdel-Shafi, I. (2021). Stressing a tired host: *Cryptosporidium* species and *Helicobacter pylori* infections in diabetes mellitus patients with gastrointestinal manifestations. *Parasitologists United Journal*, 14(3), 261–268. <https://doi.org/10.21608/puj.2021.92425.1130>
- Fan, H. N., Zhu, P., Lu, Y. M., Guo, J. H., Zhang, J., Qu, G. Q., & Zhu, J. S. (2020). Mild changes in the mucosal microbiome during terminal ileum inflammation. *Microbial Pathogenesis*, 142(June 2019), 104104. <https://doi.org/10.1016/j.micpath.2020.104104>
- Fattahi Bafghi, A., Afkhami-Ardekani, M., & Dehghani Tafti, A. (2015). Frequency Distribution of Intestinal Parasitic Infections in Diabetic Patients–Yazd 2013. *Iranian Journal Of Diabetes And Obesity*, 7 (1), 33-37
- Feranmi, F. (2022). *Blastocystis* subtype 4 linked to gut microbiota stability. *The Lancet Microbe*, 3, e564. [https://doi.org/10.1016/S2666-5247\(22\)00196-3](https://doi.org/10.1016/S2666-5247(22)00196-3)
- Fontanelli Sulekova, L., Gabrielli, S., Furzi, F., Milardi, G. L., Biliotti, E., De Angelis, M., Iaiani, G., Fimiani, C., Maiorano, M., Mattiucci, S., & Taliani, G. (2019). Molecular characterization of *Blastocystis* subtypes in HIV-positive patients and evaluation of risk factors for colonization. *BMC Infectious Diseases*, 19(1), 1–7. <https://doi.org/10.1186/s12879-019-4537-7>
- Forsell, J., Bengtsson-Palme, J., Angelin, M., Johansson, A., Evengård, B., & Granlund, M. (2017). The relation between *Blastocystis* and the intestinal microbiota in Swedish travellers. *BMC Microbiology*, 17(1), 1–9. <https://doi.org/10.1186/s12866-017-1139-7>
- Fricke, A. M., Podlesny, D., & Fricke, W. F. (2019). What is new and relevant for sequencing-based microbiome research? A mini-review. *Journal of Advanced Research*, 19, 105–112. <https://doi.org/10.1016/j.jare.2019.03.006>
- Frost, F., Storck, L. J., Kacprowski, T., Gärtner, S., Rühlemann, M., Bang, C., Franke, A., Völker, U., Aghdassi, A. A., Steveling, A., Mayerle, J., Weiss, F. U., Homuth, G., & Lerch, M. M. (2019). A structured weight loss program increases gut microbiota phylogenetic diversity and reduces levels of *Collinsella* in obese type 2 diabetics: A pilot study. *PLoS ONE*, 14(7), 1–14. <https://doi.org/10.1371/journal.pone.0219489>
- Gabrielli, S., Furzi, F., Fontanelli Sulekova, L., Taliani, G., & Mattiucci, S. (2020). Occurrence of *Blastocystis*-subtypes in patients from Italy revealed association of ST3 with a healthy gut microbiota. *Parasite Epidemiology and Control*, 9. <https://doi.org/10.1016/j.parepi.2020.e00134>
- Gabrielli, Simona, Furzi, F., Fontanelli Sulekova, L., Taliani, G., & Mattiucci, S. (2020). Occurrence of *Blastocystis*-subtypes in patients from Italy revealed

- association of ST3 with a healthy gut microbiota. *Parasite Epidemiology and Control*, 9, e00134. <https://doi.org/10.1016/j.parepi.2020.e00134>
- Galicia-Garcia, U., Benito-Vicente, A., Jebari, S., Larrea-Sebal, A., Siddiqi, H., Uribe, K. B., Ostolaza, H., & Martín, C. (2020). Pathophysiology of type 2 diabetes mellitus. *International Journal of Molecular Sciences*, 21(17), 1–34. <https://doi.org/10.3390/ijms21176275>
- Gao, Bei, Chi, L., Zhu, Y., Shi, X., Tu, P., Li, B., Yin, J., Gao, N., Shen, W., & Schnabl, B. (2021). An introduction to next generation sequencing bioinformatic analysis in gut microbiome studies. *Biomolecules*, 11(4), 1–22. <https://doi.org/10.3390/biom11040530>
- Gao, Beibei, Zhong, M., Shen, Q., Wu, Y., Cao, M., Ju, S., & Chen, L. (2020). Gut microbiota in early pregnancy among women with Hyperglycaemia vs. Normal blood glucose. *BMC Pregnancy and Childbirth*, 20(1), 1–11. <https://doi.org/10.1186/s12884-020-02961-5>
- GELEN, V., Şengul, E., Atila, G., Uslu, H., & Makav, M. (2017). Association of gestational diabetes and proinflammatory cytokines (IL-6, TNF- α and IL-1 β). *Journal of Embryology*, 1(1), 6.
- Gérard, C., & Vidal, H. (2019). Impact of gut microbiota on host glycemic control. *Frontiers in Endocrinology*, 10(JAN), 1–13. <https://doi.org/10.3389/fendo.2019.00029>
- Ghosh, T. S., Shanahan, F., & O'Toole, P. W. (2022). The gut microbiome as a modulator of healthy ageing. *Nature Reviews Gastroenterology and Hepatology*, 19(9), 565–584. <https://doi.org/10.1038/s41575-022-00605-x>
- Gomes, J. M. G., Costa, J. de A., & Alfenas, R. de C. G. (2017). Metabolic endotoxemia and diabetes mellitus: A systematic review. *Metabolism: Clinical and Experimental*, 68, 133–144. <https://doi.org/10.1016/j.metabol.2016.12.009>
- Goodwin, S., McPherson, J. D., & McCombie, W. R. (2016). Coming of age: Ten years of next-generation sequencing technologies. *Nature Reviews Genetics*, 17(6), 333–351. <https://doi.org/10.1038/nrg.2016.49>
- Guilavogui, T., Gantois, N., Even, G., Desramaut, J., Dautel, E., Denoyelle, C., Cissé, F. I., Touré, S. C., Kourouma, B. L., Sawant, M., Chabé, M., Certad, G., & Viscogliosi, E. (2022). Detection, Molecular Identification and Transmission of the Intestinal Protozoa *Blastocystis* sp. in Guinea from a Large-Scale Epidemiological Study Conducted in the Conakry Area. *Microorganisms*, 10(2). <https://doi.org/10.3390/microorganisms10020446>
- Gurung, M., Li, Z., You, H., Rodrigues, R., Jump, D. B., Morgun, A., & Shulzhenko, N. (2020). Role of gut microbiota in type 2 diabetes pathophysiology. *EBioMedicine*, 51, 1–9. <https://doi.org/10.1016/j.ebiom.2019.11.051>

- Gurung, P., & Kanneganti, T. D. (2016). Immune responses against protozoan parasites: a focus on the emerging role of Nod-like receptors. *Cellular and Molecular Life Sciences*, 73(16), 3035–3051. <https://doi.org/10.1007/s00018-016-2212-3>
- Harris, H., Ooi, Y. B. H., Lee, J. S., & Matanjun, P. (2019). Non-communicable diseases among low income adults in rural coastal communities in Eastern Sabah, Malaysia. *BMC Public Health*, 19(Suppl 4), 1–13. <https://doi.org/10.1186/s12889-019-6854-6>
- Hashimoto, Y., Hamaguchi, M., Kaji, A., Sakai, R., Osaka, T., Inoue, R., Kashiwagi, S., Mizushima, K., Uchiyama, K., Takagi, T., Naito, Y., & Fukui, M. (2020). Intake of sucrose affects gut dysbiosis in patients with type 2 diabetes. *Journal of Diabetes Investigation*, 11(6), 1623–1634. <https://doi.org/10.1111/jdi.13293>
- Hemmings, S. M. J., Malan-Müller, S., Van Den Heuvel, L. L., Demmitt, B. A., Stanislawski, M. A., Smith, D. G., Bohr, A. D., Stamper, C. E., Hyde, E. R., Morton, J. T., Marotz, C. A., Siebler, P. H., Braspenning, M., Van Crielinge, W., Hoisington, A. J., Brenner, L. A., Postolache, T. T., McQueen, M. B., Krauter, K. S., Lowry, C. A. (2017). The Microbiome in Posttraumatic Stress Disorder and Trauma-Exposed Controls: An Exploratory Study. *Psychosomatic Medicine*, 79(8), 936–946. <https://doi.org/10.1097/PSY.0000000000000512>
- Herder, C., Dalmás, E., Böni-Schnetzler, M., & Donath, M. Y. (2015). The IL-1 Pathway in Type 2 Diabetes and Cardiovascular Complications. *Trends in Endocrinology and Metabolism*, 26(10), 551–563. <https://doi.org/10.1016/j.tem.2015.08.001>
- Higuera, A., Herrera, G., Jimenez, P., García-Corredor, D., Pulido-Medellín, M., Bulla-Castañeda, D. M., Pinilla, J. C., Moreno-Pérez, D. A., Maloney, J. G., Santín, M., & Ramírez, J. D. (2021). Identification of Multiple *Blastocystis* Subtypes in Domestic Animals From Colombia Using Amplicon-Based Next Generation Sequencing. *Frontiers in Veterinary Science*, 8(August), 1–11. <https://doi.org/10.3389/fvets.2021.732129>
- Ho, L. C., Singh, M., Suresh, G., Ng, G. C., & Yap, E. H. (1993). Axenic culture of *Blastocystis hominis* in Iscove's modified Dulbecco's medium. *Parasitology Research*, 79(7), 614–616. <https://doi.org/10.1007/BF00932249>
- Htun, N. S. N., Odermatt, P., Paboriboune, P., Sayasone, S., Vongsakid, M., Phimolsarn-Nusith, V., Tran, X. D., Ounnavong, P. S., Andriama-Hefasoa, N., Senvanpan, N. D., Homsana, A., Lianosay, B., Xayavong, D., Robinson, D. R., Bounsavath, P., Prasayasith, P. P., Syphan, S. D., Lu, Y. X., Thilakoun, K., ... Probst-Hensch, N. (2018). Association between helminth infections and diabetes mellitus in adults from the Lao People's Democratic Republic: A cross-sectional study. *Infectious Diseases of Poverty*, 7(1), 1–11. <https://doi.org/10.1186/s40249-018-0488-2>
- Hu, Z., Gao, F., Qin, L., Yang, Y., & Xu, H. (2019). Research Article A Case-Control Study on Risk Factors and Their Interactions with Prediabetes among the Elderly

- in Rural Communities of Yiyang City , Hunan Province. 2019. *Journal of diabetes research*, <https://doi.org/10.1155/2019/1386048>
- Huang, L., Yeh, Y., & Chiu, S. (2023). ScienceDirect Intestinal microbiota analysis of different *Blastocystis* subtypes and *Blastocystis* -negative individuals in Taiwan. *Biomedical Journal*, October, 100661. <https://doi.org/10.1016/j.bj.2023.100661>
- Hublin, J. S. Y., Maloney, J. G., & Santin, M. (2021). *Blastocystis* in domesticated and wild mammals and birds. *Research in Veterinary Science*, 135(August 2020), 260–282. <https://doi.org/10.1016/j.rvsc.2020.09.031>
- Hussein, E. M., Hussein, A. M., Eida, M. M., & Atwa, M. M. (2008). Pathophysiological variability of different genotypes of human *Blastocystis hominis* Egyptian isolates in experimentally infected rats. *Parasitology Research*, 102(5), 853–860. <https://doi.org/10.1007/s00436-007-0833-z>
- Hussein, E. M., Muhammad, M. A. A., Hussein, A. M., Elzagawy, S. M., Zaki, W. M., Temsah, A. G., Badr, M. S., & Alabbassy, M. M. (2023). Levels of Genetic Variants Among Symptomatic *Blastocystis* Subtypes and their Relationship to Mucosal Immune Surveillance in the Precancerous Colons of Experimentally Infected Rats. *Acta Parasitologica*, 68(1), 70–83. <https://doi.org/10.1007/s11686-022-00628-z>
- Hussein, Z., Taher, S. W., Kaur, H., Singh, G., Chee, W., & Swee, S. (2015). Diabetes Care in Malaysia : Problems , New Models , and Solutions. *Annals of Global Health*, 81(6), 851–862. <https://doi.org/10.1016/j.aogh.2015.12.016>
- Ibrahim, S. S. (2020). *BLASTOCYSTIS HOMINIS IN DIABETIC AND NON-DIABETIC PATIENTS WITH IRRITABLE BOWEL SYNDROME IN BENI-SUEF CITY , EGYPT*. December 2020. <https://doi.org/10.13140/RG.2.2.23000.52482>
- Jayasudha, R., Das, T., Chakravarthy, S. K., Prashanthi, G. S., Bhargava, A., Tyagi, M., Rani, P. K., Pappuru, R. R., & Shivaji, S. (2020). Gut mycobiomes are altered in people with type 2 diabetes mellitus and diabetic retinopathy. *PLoS ONE*, 15(12 December), 1–23. <https://doi.org/10.1371/journal.pone.0243077>
- Jeremiah, S., & Parija, S. (2013). *Blastocystis*: Taxonomy, biology and virulence. *Tropical Parasitology*, 3(1), 17. <https://doi.org/10.4103/2229-5070.113894>
- Jiang, J.-B., and J.-G. He. *Taxonomic status of Blastocystis hominis*. *Parasitol. Today* 1993 9:2– 3. *International* -.
- Jiménez, P. A., Jaimes, J. E., & Ramírez, J. D. (2019). A summary of *Blastocystis* subtypes in North and South America. *Parasites & Vectors*, 1–9. <https://doi.org/10.1186/s13071-019-3641-2>
- Jiménez, P., Muñoz, M., & Ramírez, J. D. (2022). An update on the distribution of *Blastocystis* subtypes in the Americas. *Heliyon*, 8(12). <https://doi.org/10.1016/j.heliyon.2022.e12592>

- Jinatham, V., Maxamhud, S., Popluechai, S., Tsaousis, A. D., & Gentekaki, E. (2021). *Blastocystis* One Health Approach in a Rural Community of Northern Thailand: Prevalence, Subtypes and Novel Transmission Routes. *Frontiers in Microbiology*, 12(December), 1–12. <https://doi.org/10.3389/fmicb.2021.746340>
- Johnson, J. S., Spakowicz, D. J., Hong, B. Y., Petersen, L. M., Demkowicz, P., Chen, L., Leopold, S. R., Hanson, B. M., Agresta, H. O., Gerstein, M., Sodergren, E., & Weinstock, G. M. (2019). Evaluation of 16S rRNA gene sequencing for species and strain-level microbiome analysis. *Nature Communications*, 10(1), 1–11. <https://doi.org/10.1038/s41467-019-13036-1>
- Johnson, M., Thanou, A., Boreham, P. F. L., & Baverstock, P. R. (1989). *Blastocystis hominis* : Phylogenetic Sequence Comparison Determined by rRNA. 288, 283–288.
- Jolley, K. A., & Maiden, M. C. J. (2010). BIGSdb: Scalable analysis of bacterial genome variation at the population level. *BMC Bioinformatics*, 11. <https://doi.org/10.1186/1471-2105-11-595>
- Juárez-Fernández, M., Goikoetxea-Usandizaga, N., Porras, D., García-Mediavilla, M. V., Bravo, M., Serrano-Maciá, M., Simón, J., Delgado, T. C., Lachiondo-Ortega, S., Martínez-Flórez, S., Lorenzo, Ó., Rincón, M., Varela-Rey, M., Abecia, L., Rodríguez, H., Anguita, J., Nistal, E., Martínez-Chantar, M. L., & Sánchez-Campos, S. (2023). Enhanced mitochondrial activity reshapes a gut microbiota profile that delays NASH progression. *Hepatology*, 77(5), 1654–1669. <https://doi.org/10.1002/hep.32705>
- Kameoka, S., Motooka, D., Watanabe, S., Kubo, R., Jung, N., Midorikawa, Y., Shinozaki, N. O., Sawai, Y., Takeda, A. K., & Nakamura, S. (2021). Benchmark of 16S rRNA gene amplicon sequencing using Japanese gut microbiome data from the V1–V2 and V3–V4 primer sets. *BMC Genomics*, 22(1), 1–10. <https://doi.org/10.1186/s12864-021-07746-4>
- Karamati, S. A., Mirjalali, H., Niyyati, M., Yadegar, A., Asadzadeh Aghdai, H., Haghighi, A., & Seyyed Tabaei, S. J. (2021). Association of *Blastocystis* ST6 with higher protease activity among symptomatic subjects. *BMC Microbiology*, 21(1), 1–12. <https://doi.org/10.1186/s12866-021-02341-9>
- Kesuma, Y., Firmansyah, A., Bardosono, S., Puspa, I., & Kurniawan, A. (2019). *Blastocystis* ST-1 is associated with Irritable Bowel Syndrome- diarrhoea (IBS-D) in Indonesian adolescences ☆. *Parasite Epidemiology and Control*, 6, e00112. <https://doi.org/10.1016/j.parepi.2019.e00112>
- Khaled, S., Gantois, N., Ayoubi, A., Even, G., Sawant, M., El Houmayraa, J., Nabot, M., Benamrouz-Vanneste, S., Chabé, M., Certad, G., El Safadi, D., Dabboussi, F., Hamze, M., & Viscogliosi, E. (2021). *Blastocystis* sp. Prevalence and subtypes distribution amongst syrian refugee communities living in North Lebanon. *Microorganisms*, 9(1), 1–13. <https://doi.org/10.3390/microorganisms9010184>

Khaled, S., Gantois, N., Ly, A. T., Senghor, S., Even, G., Dautel, E., Dejager, R., Sawant, M., Baydoun, M., Benamrouz-Vanneste, S., Chabé, M., Ndiaye, S., Schacht, A. M., Certad, G., Riveau, G., & Viscogliosi, E. (2020). Prevalence and subtype distribution of *blastocystis* sp. In senegalese school children. *Microorganisms*, 8(9), 1–17. <https://doi.org/10.3390/microorganisms8091408>

Khalil, I. A., Troeger, C., Rao, P. C., Blacker, B. F., Brown, A., Brewer, T. G., Colombara, D. V., De Hostos, E. L., Engmann, C., Guerrant, R. L., Haque, R., Houghton, E. R., Kang, G., Korpe, P. S., Kotloff, K. L., Lima, A. A. M., Petri, W. A., Platts-Mills, J. A., Shultz, D. A., Mokdad, A. H. (2018). Morbidity, mortality, and long-term consequences associated with diarrhoea from *Cryptosporidium* infection in children younger than 5 years: a meta-analysis study. *The Lancet Global Health*, 6(7), e758–e768. [https://doi.org/10.1016/S2214-109X\(18\)30283-3](https://doi.org/10.1016/S2214-109X(18)30283-3)

Khanna, V., Lakshmi, K., Khanna, R., Verma, S., & Acharya, V. (2022). Intestinal Parasitic Infections among Diabetic Patients in Tertiary Care Hospital. *Advanced Gut & Microbiome Research*, 2022, 1–5. <https://doi.org/10.1155/2022/4829943>

Khorshidvand, Z., Khazaei, S., Amiri, M. R., Taherkhani, H., & Mirzaei, A. (2021). Worldwide prevalence of emerging parasite *Blastocystis* in immunocompromised patients: A systematic review and meta-analysis. *Microbial Pathogenesis*, 152(August), 104615. <https://doi.org/10.1016/j.micpath.2020.104615>

Kim, M. J., Lee, Y. J., Kim, T. J., & Won, E. J. (2022). Gut microbiome profiles in colonizations with the enteric protozoa *Blastocystis* in Korean populations. *Microorganisms*, 10(1), 1–9. <https://doi.org/10.3390/microorganisms10010034>

Kim, M. J., Won, E. J., Kim, S. H., Shin, J. H., & Chai, J. Y. (2020). Molecular detection and subtyping of human *Blastocystis* and the clinical implications: Comparisons between diarrheal and non-diarrheal groups in Korean populations. *Korean Journal of Parasitology*, 58(3), 321–326. <https://doi.org/10.3347/kjp.2020.58.3.321>

Kim, Y. S., & Milner, J. A. (2007). Dietary Modulation of Colon Cancer Risk. *The Journal of Nutrition*, 137(11), 2576S-2579S. <https://doi.org/10.1093/JN/137.11.2576S>

Kodio, A., Coulibaly, D., Koné, A. K., Konaté, S., Doumbo, S., Guindo, A., Bittar, F., Gouriet, F., Raoult, D., Thera, M. A., & Ranque, S. (2019). *Blastocystis* colonization is associated with increased diversity and altered gut bacterial communities in healthy Malian children. *Microorganisms*, 7(12), 1–11. <https://doi.org/10.3390/microorganisms7120649>

Kreiner, F. F., Kraaijenhof, J. M., von Herrath, M., Hovingh, G. K. K., & von Scholten, B. J. (2022). Interleukin 6 in diabetes, chronic kidney disease, and cardiovascular disease: mechanisms and therapeutic perspectives. *Expert Review of Clinical Immunology*, 18(4), 377–389. <https://doi.org/10.1080/1744666X.2022.2045952>

- Kumar, B., Kinyua, J., & Kimotho, J. (2022). Determination of microbial metagenomic markers of Type 2 Diabetes Mellitus (T2DM) in patients visiting South C Health Centre in Nairobi Kenya. *Journal of Agriculture, Science and Technology*, 21(2), 83–95. <https://doi.org/10.4314/jagst.v21i2.7>
- Kumarasamy, V., Anbazhagan, D., Subramaniyan, V., & Vellasamy, S. (2018). *Blastocystis* sp., Parasite Associated with Gastrointestinal Disorders: An Overview of its Pathogenesis, Immune Modulation and Therapeutic Strategies. *Current Pharmaceutical Design*, 24(27), 3172–3175. <https://doi.org/10.2174/1381612824666180807101536>
- Labania, L., Zoughbor, S., Ajab, S., Olanda, M., Shantour, S. N. M., & Al Rasbi, Z. (2023). The associated risk of *Blastocystis* infection in cancer: A case control study. *Frontiers in Oncology*, 13(February), 1–10. <https://doi.org/10.3389/fonc.2023.1115835>
- Lahti, L., Salonen, A., Kekkonen, R. A., Salojärvi, J., Jalanka-Tuovinen, J., Palva, A., Orešič, M., & de Vos, W. M. (2013). Associations between the human intestinal microbiota, *Lactobacillus rhamnosus* GG and serum lipids indicated by integrated analysis of high-throughput profiling data. *PeerJ*, 2013(1), 1–25. <https://doi.org/10.7717/peerj.32>
- Larsen, N., Vogensen, F. K., Van Den Berg, F. W. J., Nielsen, D. S., Andreasen, A. S., Pedersen, B. K., Al-Soud, W. A., Sørensen, S. J., Hansen, L. H., & Jakobsen, M. (2010). Gut microbiota in human adults with type 2 diabetes differs from non-diabetic adults. *PLoS ONE*, 5(2). <https://doi.org/10.1371/journal.pone.0009085>
- Lascar, N., Brown, J., Pattison, H., Barnett, A. H., Bailey, C. J., & Bellary, S. (2018). Type 2 diabetes in adolescents and young adults. In *The Lancet Diabetes and Endocrinology* (Vol. 6, Issue 1, pp. 69–80). Lancet Publishing Group. [https://doi.org/10.1016/S2213-8587\(17\)30186-9](https://doi.org/10.1016/S2213-8587(17)30186-9)
- Laterza, L., Rizzatti, G., Gaetani, E., Chiusolo, P., & Gasbarrini, A. (2016). The gut microbiota and immune system relationship in human graft-versus-host disease. *Mediterranean Journal of Hematology and Infectious Diseases*, 8(1). <https://doi.org/10.4084/MJHID.2016.025>
- Le Chatelier, E., Nielsen, T., Qin, J., Prifti, E., Hildebrand, F., Falony, G., Almeida, M., Arumugam, M., Batto, J. M., Kennedy, S., Leonard, P., Li, J., Burgdorf, K., Grarup, N., Jørgensen, T., Brandslund, I., Nielsen, H. B., Juncker, A. S., Bertalan, M., ... Yamada, T. (2013). Richness of human gut microbiome correlates with metabolic markers. *Nature*, 500(7464), 541–546. <https://doi.org/10.1038/nature12506>
- Lepczy, M., Bia, J., Dzika, E., & Koryci, J. (2017). *Blastocystis* : how do specific diets and human gut microbiota affect its development and pathogenicity ? 1531–1540. <https://doi.org/10.1007/s10096-017-2965-0>

- Lepczyńska, M., Chen, W. C., & Dzika, E. (2016). Mysterious chronic urticaria caused by *Blastocystis* spp.? *International Journal of Dermatology*, 55(3), 259–266. <https://doi.org/10.1111/ijd.13064>
- Letchumanan, G., Abdullah, N., Marlini, M., Baharom, N., Lawley, B., Omar, M. R., Mohideen, F. B. S., Addnan, F. H., Nur Fariha, M. M., Ismail, Z., & Pathmanathan, S. G. (2022). Gut Microbiota Composition in Prediabetes and Newly Diagnosed Type 2 Diabetes: A Systematic Review of Observational Studies. *Frontiers in Cellular and Infection Microbiology*, 12(August). <https://doi.org/10.3389/fcimb.2022.943427>
- Leung, J. M., Graham, A. L., & Knowles, S. C. L. (2018). Parasite-microbiota interactions with the vertebrate gut: Synthesis through an ecological lens. *Frontiers in Microbiology*, 9(MAY), 1–20. <https://doi.org/10.3389/fmicb.2018.00843>
- Levy, M., Kolodziejczyk, A. A., Thaïss, C. A., & Elinav, E. (2017). Dysbiosis and the immune system. *Nature Reviews Immunology*, 17(4), 219–232. <https://doi.org/10.1038/nri.2017.7>
- Ley, R. E. (2016). Gut microbiota in 2015: *Prevotella* in the gut: Choose carefully. *Nature Reviews Gastroenterology and Hepatology*, 13(2), 69. <https://doi.org/10.1038/nrgastro.2016.4>
- Li, Q., Chang, Y., Zhang, K., Chen, H., Tao, S., & Zhang, Z. (2020). Implication of the gut microbiome composition of type 2 diabetic patients from northern China. *Scientific Reports*, 10(1), 1–8. <https://doi.org/10.1038/s41598-020-62224-3>
- Li, W., Feng, Y., & Santin, M. (2019). Host Specificity of *Enterocytozoon bieneusi* and Public Health Implications. *Trends in Parasitology*, 35(6), 436–451. <https://doi.org/10.1016/j.pt.2019.04.004>
- Li, Y. X., Xin, H., Zhang, X. Y., Wei, C. Y., Duan, Y. H., Wang, H. F., & Niu, H. T. (2018). *Toxoplasma gondii* Infection in Diabetes Mellitus Patients in China: Seroprevalence, Risk Factors, and Case-Control Studies. *BioMed Research International*, 2018. <https://doi.org/10.1155/2018/4723739>
- Lim, M. X., Png, C. W., Tay, C. Y. B., Teo, J. D. W., Jiao, H., Lehming, N., Tan, K. S. W., & Zhang, Y. (2014). Differential regulation of proinflammatory cytokine expression by mitogen-activated protein kinases in macrophages in response to intestinal parasite infection. *Infection and Immunity*, 82(11), 4789–4801. <https://doi.org/10.1128/IAI.02279-14>
- Lim, M. Y., You, H. J., Yoon, H. S., Kwon, B., Lee, J. Y., Lee, S., Song, Y. M., Lee, K., Sung, J., & Ko, G. (2017). The effect of heritability and host genetics on the gut microbiota and metabolic syndrome. *Gut*, 66(6), 1031–1038. <https://doi.org/10.1136/gutjnl-2015-311326>

- Lindheim, L., Bashir, M., Münzker, J., Trummer, C., Zachhuber, V., Leber, B., Horvath, A., Pieber, T. R., Gorkiewicz, G., Stadlbauer, V., & Obermayer-Pietsch, B. (2017). Alterations in gut microbiome composition and barrier function are associated with reproductive and metabolic defects in women with polycystic ovary syndrome (PCOS): A pilot study. *PLoS ONE*, 12(1), 1–20. <https://doi.org/10.1371/journal.pone.0168390>
- Ling, X., Linglong, P., Weixia, D., & Hong, W. (2016). Protective effects of *bifidobacterium* on intestinal barrier function in LPS-induced enterocyte barrier injury of Caco-2 monolayers and in a rat NEC model. *PLoS ONE*, 11(8), 1–17. <https://doi.org/10.1371/journal.pone.0161635>
- Liu, J., Wang, M., Chen, W., Ma, J., Peng, Y., Zhang, M., Wang, C., Yan, G., & Lu, G. (2021). Altered Gut Microbiota Taxonomic Compositions of Patients With Sepsis in a Pediatric Intensive Care Unit. *Frontiers in Pediatrics*, 9(April), 1–8. <https://doi.org/10.3389/fped.2021.645060>
- Liu, Y. X., Qin, Y., Chen, T., Lu, M., Qian, X., Guo, X., & Bai, Y. (2020). A practical guide to amplicon and metagenomic analysis of microbiome data. *Protein and Cell*. <https://doi.org/10.1007/s13238-020-00724-8>
- Magne, F., Gotteland, M., Gauthier, L., Zazueta, A., Pessoa, S., Navarrete, P., & Balamurugan, R. (2020). The firmicutes/bacteroidetes ratio: A relevant marker of gut dysbiosis in obese patients? *Nutrients*, 12(5). <https://doi.org/10.3390/nu12051474>
- Mahmoud, A. M., Ismail, K. A., Khalifa, O. M., Abdel-wahab, M. M., Hagag, H. M., & Mahmoud, M. K. (2023). Molecular Identification of *Blastocystis hominis* Isolates in Patients with Autoimmune Diseases. *Applied Microbiology*, 3(2), 417–428. <https://doi.org/10.3390/applmicrobiol3020029>
- Maloney, J. G., Jang, Y., Molokin, A., George, N. S., & Santin, M. (2021). Wide genetic diversity of *Blastocystis* in white-tailed deer (*Odocoileus virginianus*) from Maryland, USA. *Microorganisms*, 9(6). <https://doi.org/10.3390/microorganisms9061343>
- Maloney, J. G., Lombard, J. E., Urie, N. J., Shivley, C. B., & Santin, M. (2019). Zoonotic and genetically diverse subtypes of *Blastocystis* in US pre-weaned dairy heifer calves. *Parasitology Research*, 118(2), 575–582. <https://doi.org/10.1007/s00436-018-6149-3>
- Maloney, J. G., Molokin, A., da Cunha, M. J. R., Cury, M. C., & Santin, M. (2020). *Blastocystis* subtype distribution in domestic and captive wild bird species from Brazil using next generation amplicon sequencing. *Parasite Epidemiology and Control*, 9, e00138. <https://doi.org/10.1016/j.parepi.2020.e00138>
- Maloney, J. G., Molokin, A., & Santin, M. (2019). Infection , Genetics and Evolution Next generation amplicon sequencing improves detection of *Blastocystis* mixed subtype infections. *Infection, Genetics and Evolution*, 73(April), 119–125.

<https://doi.org/10.1016/j.meegid.2019.04.013>

- Maloney, J. G., Molokin, A., Seguí, R., Maravilla, P., Martínez-Hernández, F., Villalobos, G., Tsaousis, A. D., Gentekaki, E., Muñoz-Antolí, C., Klisiewicz, D. R., Oishi, C. Y., Toledo, R., Esteban, J. G., Köster, P. C., de Lucio, A., Dashti, A., Bailo, B., Calero-Bernal, R., González-Barrio, D., ... Santín, M. (2023). Identification and Molecular Characterization of Four New *Blastocystis* Subtypes Designated ST35-ST38. *Microorganisms*, 11(1). <https://doi.org/10.3390/microorganisms11010046>
- Maloney, J. G., & Santin, M. (2021). Mind the Gap : New Full-Length Sequences of *Blastocystis* Subtypes Generated via Oxford Nanopore Minion Sequencing Allow for Comparisons between Full-Length and Partial Sequences of the Small Subunit of the Ribosomal RNA Gene.
- Mancabelli, L., Tarracchini, C., Milani, C., Lugli, G. A., Fontana, F., Turroni, F., van Sinderen, D., & Ventura, M. (2020). Multi-population cohort meta-analysis of human intestinal microbiota in early life reveals the existence of infant community state types (ICSTs). *Computational and Structural Biotechnology Journal*, 18, 2480–2493. <https://doi.org/10.1016/j.csbj.2020.08.028>
- Marchesi, J. R., Adams, D. H., Fava, F., Hermes, G. D. A., Hirschfield, G. M., Hold, G., Quraishi, M. N., Kinross, J., Smidt, H., Tuohy, K. M., Thomas, L. V., Zoetendal, E. G., & Hart, A. (2016). The gut microbiota and host health: A new clinical frontier. *Gut*, 65(2), 330–339. <https://doi.org/10.1136/gutjnl-2015-309990>
- Mardani Katak, M., Tavalla, M., & Beiromvand, M. (2019). Higher prevalence of *Blastocystis hominis* in healthy individuals than patients with gastrointestinal symptoms from Ahvaz, southwestern Iran. *Comparative Immunology, Microbiology and Infectious Diseases*, 65(February), 160–164. <https://doi.org/10.1016/j.cimid.2019.05.018>
- Marlene, R. (2013). Abundance and Diversity of Microbiota in Type 2 Diabetes and Obesity. *Journal of Diabetes & Metabolism*, 04(03). <https://doi.org/10.4172/2155-6156.1000253>
- Maskarinec, G., Raquinio, P., Kristal, B. S., Setiawan, V. W., Wilkens, L. R., Franke, A. A., Lim, U., Marchand, L. Le, Randolph, T. W., Lampe, J. W., & Hullar, M. A. J. (2021). The gut microbiome and type 2 diabetes status in the Multiethnic Cohort. *PLoS ONE*, 16(6 June), 1–15. <https://doi.org/10.1371/journal.pone.0250855>
- Matovelle, C., Tejedor, M. T., Monteagudo, L. V., Beltrán, A., & Quílez, J. (2022). Prevalence and Associated Factors of *Blastocystis* sp. Infection in Patients with Gastrointestinal Symptoms in Spain: A Case-Control Study. *Tropical Medicine and Infectious Disease*, 7(9). <https://doi.org/10.3390/tropicalmed7090226>
- Mattiucci, S., Crisafi, B., Gabrielli, S., Paoletti, M., & Cancrini, G. (2016). Molecular epidemiology and genetic diversity of *Blastocystis* infection in humans in Italy. *Epidemiology and Infection*, 144(3), 635–646.

<https://doi.org/10.1017/S0950268815001697>

- Mayneris-Perxachs, J., Arnoriaga-Rodríguez, M., Garre-Olmo, J., Puig, J., Ramos, R., Trelis, M., Burokas, A., Coll, C., Zapata-Tona, C., Pedraza, S., Pérez-Brocal, V., Ramió, L., Ricart, W., Moya, A., Jové, M., Sol, J., Portero-Otin, M., Pamplona, R., Maldonado, R., & Fernández-Real, J. M. (2022). Presence of *Blastocystis* in gut microbiota is associated with cognitive traits and decreased executive function. *ISME Journal*, 16(9), 2181–2197. <https://doi.org/10.1038/s41396-022-01262-3>
- Mehlhorn, H. (1988). *Blastocystis hominis*, Brumpt 1912: Are there different stages or species? *Parasitology Research*, 74(4), 393–395. <https://doi.org/10.1007/BF00539464>
- Mirza, H., Wu, Z., Teo, J. D. W., & Tan, K. S. W. (2012). Statin pleiotropy prevents rho kinase-mediated intestinal epithelial barrier compromise induced by *Blastocystis* cysteine proteases. *Cellular Microbiology*, 14(9), 1474–1484. <https://doi.org/10.1111/j.1462-5822.2012.01814.x>
- Mohammad, N. A., Mastuki, M. F., Al-Mekhlafi, H. M., Moktar, N., & Anuar, T. S. (2018). Comparative study of wheatley's trichrome stain and in-vitro culture against PCR assay for the diagnosis of *Blastocystis* sp. in stool samples. *Iranian Journal of Parasitology*, 13(1), 127–136.
- Mohtashamipour, M., Ghaffari Hoseini, S., Pestehchian, N., Yousefi, H., Fallah, E., & Hazratian, T. (2015). Intestinal parasitic infections in patients with Diabetes Mellitus: A case-control study. *Journal of Analytical Research in Clinical Medicine*, 3(3), 157–163. <https://doi.org/10.15171/jarc.m.2015.025>
- Molan, A., Nosaka, K., Hunter, M., & Wang, W. (2020). The association between *Toxoplasma gondii* and type 2 diabetes mellitus: a systematic review and meta-analysis of human case-control studies. *Bulletin of the National Research Centre*, 44(1). <https://doi.org/10.1186/s42269-019-0256-x>
- Momčilović, S., Cantacessi, C., Arsić-Arsenijević, V., Otranto, D., & Tasić-Otašević, S. (2019). Rapid diagnosis of parasitic diseases: current scenario and future needs. *Clinical Microbiology and Infection*, 25(3), 290–309. <https://doi.org/10.1016/j.cmi.2018.04.028>
- Momin, A. A., Bankar, M. P., & Bhoite, G. M. (2016). Study of Common Genetic Variant S447X in Lipoprotein Lipase and Its Association with Lipids and Lipoproteins in Type 2 Diabetic Patients. *Indian Journal of Clinical Biochemistry*, 31(3), 286–293. <https://doi.org/10.1007/s12291-015-0531-z>
- Mouries, J., Brescia, P., Silvestri, A., Spadoni, I., Sorribas, M., Wiest, R., Miletì, E., Galbiati, M., Invernizzi, P., Adorini, L., Penna, G., & Rescigno, M. (2019). Microbiota-driven gut vascular barrier disruption is a prerequisite for non-alcoholic steatohepatitis development. *Journal of Hepatology*, 71(6), 1216–1228. <https://doi.org/10.1016/j.jhep.2019.08.005>

- Muadica, A. S., Köster, P. C., Dashti, A., Bailo, B., Hernández-De-mingo, M., Reh, L., Balasegaram, S., Verlander, N. Q., Chércoles, E. R., & Carmena, D. (2020). Molecular diversity of *Giardia duodenalis*, *cryptosporidium* spp. And *blastocystis* sp. in asymptomatic school children in Leganés, Madrid (Spain). *Microorganisms*, 8(4), 1–17. <https://doi.org/10.3390/microorganisms8040466>
- Mudassar, S., Javaid, A., Ali, M., & Ansari, F. (2018). Section : Pathology Comparative Study of Intestinal Parasites Isolated and Identified from Type-2 Diabetic and Non-Diabetic Population Reporting to Arif Memorial Hospital , Lahore Section : *Pathology*. 5(1), 5–7.
- Mülayim, S., Aykur, M., Dağcı, H., Dalkılıç, S., Aksoy, A., & Kaplan, M. (2021). Investigation of Isolated *Blastocystis* Subtypes from Cancer Patients in Turkey. *Acta Parasitologica*, 0123456789. <https://doi.org/10.1007/s11686-020-00322-y>
- Nadeau, D. A. (2014). Management of type 2 diabetes mellitus in self- motivated patients: Optimized diet, exercise, and medication for weight loss and cardiometabolic fitness. *Physician and Sportsmedicine*, 42(4), 49–59. <https://doi.org/10.3810/psm.2014.11.2091>
- Nagel, R., Traub, R. J., Allcock, R. J. N., Kwan, M. M. S., & Bielefeldt-Ohmann, H. (2016). Comparison of faecal microbiota in *Blastocystis*-positive and *Blastocystis* negative irritable bowel syndrome patients. *Microbiome*, 4, 1–9. <https://doi.org/10.1186/s40168-016-0191-0>
- Natasa, M. (2017). BLASTOCYSTIS HOMINIS : A MYSTERIOUS AND COMMONLY DISREGARDED BLASTOCYSTIS HOMINIS : *February*. <https://doi.org/10.22190/FUMB161027001T>
- Navab-Moghadam, F., Sedighi, M., Khamseh, M. E., Alaei-Shahmiri, F., Talebi, M., Razavi, S., & Amirmozafari, N. (2017). The association of type II diabetes with gut microbiota composition. *Microbial Pathogenesis*, 110, 630–636. <https://doi.org/10.1016/j.micpath.2017.07.034>
- Nayman, E. I., Schwartz, B. A., Polmann, M., Gumabong, A. C., Nieuwdorp, M., Cickovski, T., & Mathee, K. (2024). Differences in gut microbiota between Dutch and South-Asian Surinamese: potential implications for type 2 diabetes mellitus. *Scientific Reports*, 14(1), 1–14. <https://doi.org/10.1038/s41598-024-54769-4>
- Nearing, J. T., Douglas, G. M., Comeau, A. M., & Langille, M. G. I. (2018). Denoising the Denoisers: An independent evaluation of microbiome sequence error-correction approaches. *PeerJ*, 2018(8), 1–22. <https://doi.org/10.7717/peerj.5364>
- Neoh, H., Chin, M. A. O. N. S. A. M. S. F., Ang, M. Y., Mazlan, L., Ngiu, C. S., & Jamal., R. (2018). Gut microbiome profiling of malaysians: a snapshot. *Gut*, 67(Suppl 2), A13.
- Nieves-Ramirez, M. E., Partida-Rodriguez, O., Laforest-Lapointe, L. A., Reynolds, L. A., Brown, E. M., Morien, E., Parfrey, L. W., Jin, M., Walter, J., Torres, J., Arrieta,

- M. C., & Finlay, B. B. (2018). Asymptomatic Intestinal Colonization with Protist *Blastocystis*. *Host-Microbe Biology*, 3(3), 1–18.
- Nirmalkar, K., Murugesan, S., Pizano-Zárate, M. L., Villalobos-Flores, L. E., García-González, C., Morales-Hernández, R. M., Nuñez-Hernández, J. A., Hernández-Quiroz, F., Romero-Figueroa, M. D. S., Hernández-Guerrero, C., Hoyo-Vadillo, C., & García-Mena, J. (2018). Gut microbiota and endothelial dysfunction markers in obese Mexican children and adolescents. *Nutrients*, 10(12). <https://doi.org/10.3390/nu10122009>
- Noradilah, S. A., Moktar, N., Anuar, T. S., Lee, I. L., Salleh, F., Nor, S., Abdul, A., Shazleen, N., Mohd, H., & Azrul, S. M. (2017). *Molecular epidemiology of blastocystosis in Malaysia : does seasonal variation play an important role in determining the distribution and risk factors of Blastocystis subtype infections in the Aboriginal community ?* 1–12. <https://doi.org/10.1186/s13071-017-2294-2>
- Noradilah, S. A., Moktar, N., Lee, I. L., Salleh, F. M., & Anuar, T. S. (2018). Comparison of direct examination and in vitro culture for the detection of *blastocystis* sp. In orang asli stool samples. *Sains Malaysiana*, 47(9), 2099–2104. <https://doi.org/10.17576/jsm-2018-4709-18>
- Nourrisson, C., Scanzi, J., Pereira, B., NkoudMongo, C., Wawrzyniak, I., Cian, A., Viscogliosi, E., Livrelli, V., Delbac, F., Dapoigny, M., & Poirier, P. (2014). *Blastocystis* is associated with decrease of fecal microbiota protective bacteria: Comparative analysis between patients with irritable bowel syndrome and control subjects. *PLoS ONE*, 9(11). <https://doi.org/10.1371/journal.pone.0111868>
- O'Brien Andersen, L., Karim, A. B., Roager, H. M., Vignæs, L. K., Krogfelt, K. A., Licht, T. R., & Stensvold, C. R. (2016). Associations between common intestinal parasites and bacteria in humans as revealed by qPCR. *European Journal of Clinical Microbiology and Infectious Diseases*, 35(9), 1427–1431. <https://doi.org/10.1007/s10096-016-2680-2>
- O'Hara, A. M., & Shanahan, F. (2006). The gut flora as a forgotten organ. *EMBO Reports*, 7(7), 688–693. <https://doi.org/10.1038/sj.embor.7400731>
- Odamaki, T., Kato, K., Sugahara, H., Hashikura, N., Takahashi, S., Xiao, J. Z., Abe, F., & Osawa, R. (2016). Age-related changes in gut microbiota composition from newborn to centenarian: A cross-sectional study. *BMC Microbiology*, 16(1), 1–12. <https://doi.org/10.1186/s12866-016-0708-5>
- Oliva, J., Gómez, G., Itzel, I., Ochoa, L., Lizeth, I., & Medina, R. (2022). Relationship Among Blastocystis , the Firmicutes / Bacteroidetes Ratio and Chronic Stress in Mexican University Students. *Current Microbiology*, 79(3), 1–11. <https://doi.org/10.1007/s00284-021-02756-7>
- Olusegun, F., Odunayo, S., Omoregie, R., & Egbe, C. (2013). Intestinal parasitic infections among diabetes mellitus patients. *BGM*, 5(1–2), 44–47. <https://doi.org/10.1016/j.gmbhs.2013.05.003>

- Olyaiee, A., Sadeghi, A., Yadegar, A., Mirsamadi, E. S., & Mirjalali, H. (2022). Gut Microbiota Shifting in Irritable Bowel Syndrome: The Mysterious Role of *Blastocystis* sp. *Frontiers in Medicine*, 9(June). <https://doi.org/10.3389/fmed.2022.890127>
- Osorio-Pulgarin, M. I., Higuera, A., Beltran-álzate, J. C., Sánchez-Jiménez, M., & Ramírez, J. D. (2021). Epidemiological and molecular characterization of *blastocystis* infection in children attending daycare centers in medellín, Colombia. *Biology*, 10(7), 1–14. <https://doi.org/10.3390/biology10070669>
- Partida-Rodríguez, O., Serrano-Vázquez, A., Nieves-Ramírez, M. E., Moran, P., Rojas, L., Portillo, T., González, E., Hernández, E., Finlay, B. B., & Ximenez, C. (2017). Human Intestinal Microbiota: Interaction Between Parasites and the Host Immune Response. *Archives of Medical Research*, 48(8), 690–700. <https://doi.org/10.1016/j.arcmed.2017.11.015>
- Pedersen, H. K., Gudmundsdottir, V., Nielsen, H. B., Hyotylainen, T., Nielsen, T., Jensen, B. A. H., Forslund, K., Hildebrand, F., Prifti, E., Falony, G., Le Chatelier, E., Levenez, F., Doré, J., Mattila, I., Plichta, D. R., Pöhö, P., Hellgren, L. I., Arumugam, M., Sunagawa, S., ... Pedersen, O. (2016). Human gut microbes impact host serum metabolome and insulin sensitivity. *Nature*, 535(7612), 376–381. <https://doi.org/10.1038/nature18646>
- Peña, S., Carrasco, G., Rojas, P., Castillo, D., Ozaki, L. S., & Mercado, R. (2020). Determination of subtypes of *Blastocystis* sp. in Chilean patients with and without inflammatory bowel syndrome, A preliminary report. *Parasite Epidemiology and Control*, 8, e00125. <https://doi.org/10.1016/j.parepi.2019.e00125>
- Peng, W. (2020). *Integrated 16S rRNA Sequencing , Metagenomics , and Metabolomics to Characterize Gut Microbial Composition , Function , and Fecal Metabolic Phenotype in Non-obese Type 2 Diabetic Goto-Kakizaki Rats*. 10(January), 1–13. <https://doi.org/10.3389/fmicb.2019.03141>
- Petakh, P., Kamyshna, I., Oksenysh, V., Kainov, D., & Kamyshnyi, A. (2023). Metformin Therapy Changes Gut Microbiota Alpha-Diversity in COVID-19 Patients with Type 2 Diabetes: The Role of SARS-CoV-2 Variants and Antibiotic Treatment. *Pharmaceuticals*, 16(6), 904. <https://doi.org/10.3390/ph16060904>
- Poorkhosravani, Z., Agholi, M., Sharifi-sarasiabi, K., & Shamseddin, J. (2019). *Frequency of Intestinal Parasites in Patients with Diabetes Mellitus Compared with Healthy Controls in Fasa , Fars Province , Iran , 2018*. 23(2). <https://doi.org/10.5812/hmj.91284.Research>
- Popruk, N., Prasongwattana, S., Mahittikorn, A., Palasuwan, A., Popruk, S., & Palasuwan, D. (n.d.). *Prevalence and Subtype Distribution of Blastocystis Infection in Patients with Diabetes Mellitus in Thailand*. <https://doi.org/10.3390/ijerph17238877>

- Popruk, N., Prasongwattana, S., Mahittikorn, A., Palasuwan, A., Popruk, S., & Palasuwan, D. (2020). Prevalence and subtype distribution of *blastocystis* infection in patients with diabetes mellitus in Thailand. *International Journal of Environmental Research and Public Health*, 17(23), 1–12. <https://doi.org/10.3390/ijerph17238877>
- Puthia, M. K., Lu, J., & Tan, K. S. W. (2008). *Blastocystis ratti* contains cysteine proteases that mediate interleukin-8 response from human intestinal epithelial cells in an NF- κ B-dependent manner. *Eukaryotic Cell*, 7(3), 435–443. <https://doi.org/10.1128/EC.00371-07>
- Puthia, M. K., Vaithilingam, A., Lu, J., & Tan, K. S. W. (2005). Degradation of human secretory immunoglobulin a by *Blastocystis*. *Parasitology Research*, 97(5), 386–389. <https://doi.org/10.1007/s00436-005-1461-0>
- Qu, D., Liu, J., Lau, C. W., & Huang, Y. (2014). IL-6 in diabetes and cardiovascular complications. *British Journal of Pharmacology*, 171(15), 3595–3603. <https://doi.org/10.1111/bph.12713>
- Que, Y., Cao, M., He, J., Zhang, Q., Chen, Q., Yan, C., Lin, A., Yang, L., Wu, Z., Zhu, D., Chen, F., Chen, Z., Xiao, C., Hou, K., & Zhang, B. (2021). Gut Bacterial Characteristics of Patients With Type 2 Diabetes Mellitus and the Application Potential. *Frontiers in Immunology*, 12(August), 1–11. <https://doi.org/10.3389/fimmu.2021.722206>
- Rajamanikam, A., Isa, M. N. M., Samudi, C., Devaraj, S., & Govind, S. K. (2023). Gut bacteria influence *Blastocystis* sp. phenotypes and may trigger pathogenicity. *PLoS Neglected Tropical Diseases*, 17(3), 1–20. <https://doi.org/10.1371/journal.pntd.0011170>
- Rehman, K., & Akash, M. S. H. (2016). Mechanisms of inflammatory responses and development of insulin resistance: How are they interlinked? *Journal of Biomedical Science*, 23(1), 1–18. <https://doi.org/10.1186/s12929-016-0303-y>
- Rehman, K., & Akash, M. S. H. (2017). Mechanism of Generation of Oxidative Stress and Pathophysiology of Type 2 Diabetes Mellitus: How Are They Interlinked? *Journal of Cellular Biochemistry*, 118(11), 3577–3585. <https://doi.org/10.1002/jcb.26097>
- Rinninella, E., Raoul, P., Cintoni, M., Franceschi, F., Miggiano, G. A. D., Gasbarrini, A., & Mele, M. C. (2019). What is the healthy gut microbiota composition? A changing ecosystem across age, environment, diet, and diseases. *Microorganisms*, 7(1). <https://doi.org/10.3390/microorganisms7010014>
- Roberts, T., Stark, D., Harkness, J., & Ellis, J. (2014). Update on the pathogenic potential and treatment options for *Blastocystis* sp. *Gut Pathogens*, 6(1). <https://doi.org/10.1186/1757-4749-6-17>

- Roberts, Tamalee, Barratt, J., Harkness, J., Ellis, J., & Stark, D. (2011). Comparison of microscopy, culture, and conventional polymerase chain reaction for detection of *Blastocystis* sp. in clinical stool samples. *American Journal of Tropical Medicine and Hygiene*, 84(2), 308–312. <https://doi.org/10.4269/ajtmh.2011.10-0447>
- Robles-Cabrera, M. X., Maguiña, J. L., Gonzales-Huerta, L., Panduro-Correa, V., Dámaso-Mata, B., Pecho-Silva, S., Navarro-Solsol, A. C., Rabaan, A. A., Rodríguez-Morales, A. J., & Arteaga-Livias, K. (2021). *Blastocystis* species and gastrointestinal symptoms in peruvian adults attended in a public hospital. *Infection and Chemotherapy*, 53(2), 374–380. <https://doi.org/10.3947/IC.2021.0004>
- Rodrigues, K. F., Pietrani, N. T., Bosco, A. A., Campos, F. M. F., Sandrim, V. C., & Gomes, K. B. (2017). IL-6, TNF- α , and IL-10 levels/ polymorphisms and their association with type 2 diabetes mellitus and obesity in Brazilian individuals. *Archives of Endocrinology and Metabolism*, 61(5), 438–446. <https://doi.org/10.1590/2359-3997000000254>
- Rojas-Velázquez, L., Maloney, J. G., Molokin, A., Morán, P., Serrano-Vázquez, A., González, E., Pérez-Juárez, H., Ximénez, C., & Santin, M. (2019). Use of next-generation amplicon sequencing to study *Blastocystis* genetic diversity in a rural human population from Mexico. *Parasites and Vectors*, 12(1), 1–10. <https://doi.org/10.1186/s13071-019-3814-z>
- Rojas-Velázquez, L., Morán, P., Serrano-Vázquez, A., Portillo-Bobadilla, T., González, E., Pérez-Juárez, H., Hernández, E., Partida-Rodríguez, O., Nieves-Ramírez, M., Padilla, A., Zaragoza, M., & Ximénez, C. (2022). The regulatory function of *Blastocystis* spp. on the immune inflammatory response in the gut microbiome. *Frontiers in Cellular and Infection Microbiology*, 12(August), 1–9. <https://doi.org/10.3389/fcimb.2022.967724>
- Rooks, M. G., & Garrett, W. S. (2016). Gut microbiota, metabolites and host immunity. *Nature Reviews Immunology*, 16(6), 341–352. <https://doi.org/10.1038/nri.2016.42>
- Saad, M. J. A., Santos, A., & Prada, P. O. (2016). Linking gut microbiota and inflammation to obesity and insulin resistance. *Physiology*, 31(4), 283–293. <https://doi.org/10.1152/physiol.00041.2015>
- Saeedi, P., Petersohn, I., Salpea, P., Malanda, B., Karuranga, S., Unwin, N., Colagiuri, S., Guariguata, L., Motala, A. A., Ogurtsova, K., Shaw, J. E., Bright, D., & Williams, R. (2019). Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: Results from the International Diabetes Federation Diabetes Atlas, 9th edition. *Diabetes Research and Clinical Practice*, 157, 107843. <https://doi.org/10.1016/j.diabres.2019.107843>
- Safadi, D. El, Cian, A., Nourrisson, C., Pereira, B., Morelle, C., Bastien, P., Bellanger, A., Botterel, F., Candolfi, E., Desoubreux, G., Lachaud, L., Morio, F., Pomares, C., Rabodonirina, M., Wawrzyniak, I., Delbac, F., & Gantois, N. (2016). Prevalence , risk factors for infection and subtype distribution of the intestinal

- parasite *Blastocystis* sp . from a large-scale multi-center study in France. *BMC Infectious Diseases*, 1–11. <https://doi.org/10.1186/s12879-016-1776-8>
- Şahin, M., Taş Cengiz, Z., Galip Halidi, A., & Aydemir, S. (2023). Investigation of *Blastocystis* hominis Frequency in Patients with Diabetes by Microscopy and Conventional PCR Methods. *Iranian Journal of Parasitology*, 18(2), 202–210. <https://doi.org/10.18502/ijpa.v18i2.13186>
- Salamon, D., Sroka-Oleksiak, A., Gurgul, A., Arent, Z., Szopa, M., Bulanda, M., Małecki, M. T., & Gosiewski, T. (2021). Analysis of the gut mycobioime in adult patients with type 1 and type 2 diabetes using next-generation sequencing (Ngs) with increased sensitivity—pilot study. *Nutrients*, 13(4), 1–16. <https://doi.org/10.3390/nu13041066>
- Salamon, D., Sroka-Oleksiak, A., Kapusta, P., Szopa, M., Mrozińska, S., Ludwig-Słomczyńska, A. H., Wołkow, P. P., Bulanda, M., Klupa, T., Małecki, M. T., & Gosiewski, T. (2018). Characteristics of the gut microbiota in adult patients with type 1 and 2 diabetes based on the analysis of a fragment of 16S rRNA gene using next-generation sequencing. *Polish Archives of Internal Medicine*. <https://doi.org/10.20452/pamw.4246>
- Salamon, D., Zapala, B., Krawczyk, A., Potasiewicz, A., Nikiforuk, A., Stój, A., & Gosiewski, T. (2022). Comparison of iSeq and MiSeq as the two platforms for 16S rRNA sequencing in the study of the gut of rat microbiome. *Applied Microbiology and Biotechnology*, 106(22), 7671–7681. <https://doi.org/10.1007/s00253-022-12251-z>
- Samsudin, S., Abdullah, N., & Dewi Applanaidu, S. (2016). The Prevalence of Diabetes Mellitus and Hypertension and its Effects on Healthcare Demand among Elderly in Malaysia. *International Journal of Public Health Research*, 6(2), 741–749.
- Sanna, S., van Zuydam, N. R., Mahajan, A., Kurilshikov, A., Vich Vila, A., Vösa, U., Mujagic, Z., Masclee, A. A. M., Jonkers, D. M. A. E., Oosting, M., Joosten, L. A. B., Netea, M. G., Franke, L., Zhernakova, A., Fu, J., Wijmenga, C., & McCarthy, M. I. (2019). Causal relationships among the gut microbiome, short-chain fatty acids and metabolic diseases. *Nature Genetics*, 51(4), 600–605. <https://doi.org/10.1038/s41588-019-0350-x>
- Sari, M. I., Tala, Z. Z., & Wahyuni, D. D. (2019). Association between glycated hemoglobin with the levels of serum proinflammatory cytokines and antioxidants in patients with type 2 diabetes mellitus in universitas sumatera utara hospital. *Open Access Macedonian Journal of Medical Sciences*, 7(5), 715–720. <https://doi.org/10.3889/oamjms.2019.168>
- Satam, H., Joshi, K., Mangrolia, U., Waghoo, S., Zaidi, G., Rawool, S., Thakare, R. P., Banday, S., Mishra, A. K., Das, G., & Malonia, S. K. (2023). Next-Generation Sequencing Technology: Current Trends and Advancements. *Biology*, 12(7), 1–25. <https://doi.org/10.3390/biology12070997>

- Scicluna, S. M., Tawari, B., & Clark, C. G. (2006). DNA Barcoding of *Blastocystis*. *Protist*, 157(1), 77–85. <https://doi.org/10.1016/J.PROTIS.2005.12.001>
- Sears, B., & Perry, M. (2015). The role of fatty acids in insulin resistance. *Lipids in Health and Disease*, 14(1), 1–9. <https://doi.org/10.1186/s12944-015-0123-1>
- Sedighi, M., Razavi, S., Navab-Moghadam, F., Khamseh, M. E., Alaei-Shahmiri, F., Mehrtash, A., & Amirmozafari, N. (2017). Comparison of gut microbiota in adult patients with type 2 diabetes and healthy individuals. *Microbial Pathogenesis*, 111, 362–369. <https://doi.org/10.1016/j.micpath.2017.08.038>
- Sekar, U., & Shanthi, M. (2015). *Recent insights into the genetic diversity , epidemiology and clinical relevance of Blastocystis species*. 1(1), 33–39.
- Shah, V., Lambeth, S. M., Carson, T., Lowe, J., Ramaraj, T., Leff, J. W., Luo, L., & Bell, C. J. (2015). Composition Diversity and Abundance of Gut Microbiome in Prediabetes and Type 2 Diabetes. *Journal of Diabetes and Obesity*, 2(2), 108–114. <https://doi.org/10.15436/2376-0949.15.031>
- Shin, N. R., Whon, T. W., & Bae, J. W. (2015). Proteobacteria: Microbial signature of dysbiosis in gut microbiota. *Trends in Biotechnology*, 33(9), 496–503. <https://doi.org/10.1016/j.tibtech.2015.06.011>
- Silberman, J. D., Sogin, M. L., Leipe, D. D., & Clark, C. G. (1996). Human parasite finds taxonomic home [8]. In *Nature* (Vol. 380, Issue 6573, p. 398). <https://doi.org/10.1038/380398a0>
- Silva, M. do R. A., Melo, G. B., Malta, F. M., Abdala, E., Costa, S. F., Pierrotti, L. C., Gonçalves, E. M. N., Castilho, V. L. P., Chieffi, P. P., Gryscek, R. C. B., & Paula, F. M. (2020). Subtypes of *Blastocystis* sp. isolated in fecal samples from transplant candidates in São Paulo, Brazil. *Parasite Epidemiology and Control*, 8, 4–8. <https://doi.org/10.1016/j.parepi.2019.e00128>
- Simpson, A. G. B., Roger, A. J., Silberman, J. D., Leipe, D. D., Edgcomb, V. P., Jermini, L. S., Patterson, D. J., Sogin, M. L., Kofoed, C. A., Christiansen, E. B., Ford, B., & Cox, F. E. G. (2002). The Discovery of *Giardia*. *Proceedings of the National Academy of Sciences*, 19(September 2004), 147–153. <https://doi.org/10.1128/CMR.15.4.595>
- Sirisinha, S. (2016). The potential impact of gut microbiota on your health: Current status and future challenges. *Asian Pacific Journal of Allergy and Immunology*, 34(4), 249–264. <https://doi.org/10.12932/AP0803>
- Sitotaw, B., & Shiferaw, W. (2020). Prevalence of Intestinal Parasitic Infections and Associated Risk Factors among the First-Cycle Primary Schoolchildren in Sasiga District, Southwest Ethiopia. *Journal of Parasitology Research*, 2020. <https://doi.org/10.1155/2020/8681247>

- Slouha, E., Rezazadah, A., Farahbod, K., Gerts, A., Clunes, L. A., & Kollias, T. F. (2023). Type-2 Diabetes Mellitus and the Gut Microbiota: Systematic Review. *Cureus*, 15(11). <https://doi.org/10.7759/cureus.49740>
- Sohail, M. U., Althani, A., Anwar, H., Rizzi, R., & Marei, H. E. (2017). Role of the Gastrointestinal Tract Microbiome in the Pathophysiology of Diabetes Mellitus. *Journal of Diabetes Research*, 2017. <https://doi.org/10.1155/2017/9631435>
- Standl, E., Khunti, K., Hansen, T. B., & Schnell, O. (2019). The global epidemics of diabetes in the 21st century: Current situation and perspectives. *European Journal of Preventive Cardiology*, 26(2_suppl), 7–14. <https://doi.org/10.1177/2047487319881021>
- Stark, D., Barratt, J. L. N., Hal, S. Van, Marriott, D., Harkness, J., & Ellis, J. T. (2010). *Clinical Significance of Enteric Protozoa in the Immunosuppressed Human Population*. 22(4), 634–650. <https://doi.org/10.1128/CMR.00017-09>
- Stensvold, C. (2013). *Blastocystis*: Genetic diversity and molecular methods for diagnosis and epidemiology. *Tropical Parasitology*, 3(1), 26. <https://doi.org/10.4103/2229-5070.113896>
- Stensvold, C. Rune, Alfellani, M., & Clark, C. G. (2012). Levels of genetic diversity vary dramatically between *Blastocystis* subtypes. *Infection, Genetics and Evolution*, 12(2), 263–273. <https://doi.org/10.1016/J.MEEGID.2011.11.002>
- Stensvold, C. Rune, & Clark, C. G. (2016). Current status of *Blastocystis*: A personal view. *Parasitology International*, 65(6), 763–771. <https://doi.org/10.1016/j.parint.2016.05.015>
- Stensvold, C. Rune, & Clark, C. G. (2016). *Molecular Identification and Subtype Analysis of Blastocystis*. November, 1–10. <https://doi.org/10.1002/cpmc.17>
- Stensvold, Christen Rune, Christiansen, D. B., Olsen, K. E. P., & Nielsen, H. V. (2011). *Blastocystis* sp. subtype 4 is common in Danish *Blastocystis*-positive patients presenting with acute diarrhea. *American Journal of Tropical Medicine and Hygiene*, 84(6), 883–885. <https://doi.org/10.4269/ajtmh.2011.11-0005>
- Stensvold, Christen Rune, & Clark, C. G. (2020). Pre-empting Pandora's Box: *Blastocystis* Subtypes Revisited. *Trends in Parasitology*, 36(3), 229–232. <https://doi.org/10.1016/j.pt.2019.12.009>
- Stensvold, Christen Rune, Sørland, B. A., Berg, R. P. K. D., Andersen, L. O., van der Giezen, M., Bowtell, J. L., El-Badry, A. A., Belkessa, S., Kurt, Ö., & Nielsen, H. V. (2022). Stool Microbiota Diversity Analysis of *Blastocystis*-Positive and *Blastocystis*-Negative Individuals. *Microorganisms*, 10(2), 4–9. <https://doi.org/10.3390/microorganisms10020326>

- Stensvold, Christen Rune, & van der Giezen, M. (2018). Associations between Gut Microbiota and Common Luminal Intestinal Parasites. *Trends in Parasitology*, 34(5), 369–377. <https://doi.org/10.1016/j.pt.2018.02.004>
- Stensvold, R., Brillowska-Dabrowska, A., Nielsen, H. V., & Arendrup, M. C. (2006). DETECTION OF *BLASTOCYSTIS HOMINIS* IN UNPRESERVED STOOL SPECIMENS BY USING POLYMERASE CHAIN REACTION. *Journal of Parasitology*, 92(5), 1081–1087. <https://doi.org/10.1645/ge-840r.1>
- Stenzel, D. J., & Boreham, P. F. L. (1996). *Blastocystis hominis* Revisited. 9(4), 563–584.
- Su, T., Liu, R., Lee, A., Long, Y., Du, L., Lai, S., Chen, X., Wang, L., Si, J., Owyang, C., & Chen, S. (2018). Altered intestinal microbiota with increased abundance of prevotella is associated with high risk of diarrhea-predominant irritable bowel syndrome. *Gastroenterology Research and Practice*, 2018, 11–13. <https://doi.org/10.1155/2018/6961783>
- Sun, L., Yu, Z., Ye, X., Zou, S., Li, H., Yu, D., Wu, H., Chen, Y., Dore, J., Clément, K., Hu, F. B., & Lin, X. (2010). A marker of endotoxemia is associated with obesity and related metabolic disorders in apparently healthy Chinese. *Diabetes Care*, 33(9), 1925–1932. <https://doi.org/10.2337/dc10-0340>
- Tahapary, D. L., de Ruiter, K., Martin, I., van Lieshout, L., Guigas, B., Soewondo, P., Djuardi, Y., Wiria, A. E., Mayboroda, O. A., Houwing-Duistermaat, J. J., Tasman, H., Sartono, E., Yazdanbakhsh, M., Smit, J. W. A., & Supali, T. (2015). Helminth infections and type 2 diabetes: A cluster-randomized placebo controlled SUGARSPIN trial in Nangapanda, Flores, Indonesia. *BMC Infectious Diseases*, 15(1), 1–9. <https://doi.org/10.1186/s12879-015-0873-4>
- Takagi, T., Naito, Y., Kashiwagi, S., Uchiyama, K., Mizushima, K., Kamada, K., Ishikawa, T., Inoue, R., Okuda, K., Tsujimoto, Y., Ohnogi, H., & Itoh, Y. (2020). Changes in the gut microbiota are associated with hypertension, hyperlipidemia, and type 2 diabetes mellitus in Japanese subjects. *Nutrients*, 12(10), 1–13. <https://doi.org/10.3390/nu12102996>
- Tan, K. S. W. (2008). New insights on classification, identification, and clinical relevance of *Blastocystis* spp. *Clinical Microbiology Reviews*, 21(4), 639–665. <https://doi.org/10.1128/CMR.00022-08>
- Tan, K. S. W., & Mirza, H. (2012). *Blastocystis–Host Interactions: Insights from In Vitro Model Systems* (pp. 51–63). https://doi.org/10.1007/978-3-642-32738-4_4
- Tangi, F. B., Fokam, E. B., Longdoh, N. A., & Eteneneng, E. J. (2016). Intestinal Parasites in Diabetes Mellitus Patients in the Limbe and Buea Municipalities, Cameroon. *Diabetes Research - Open Journal*, 2(1), 1–7. <https://doi.org/10.17140/droj-2-123>

- Teo, J. D. W., MacAry, P. A., & Tan, K. S. W. (2014). Pleiotropic effects of *blastocystis* spp. subtypes 4 and 7 on ligand-specific toll-like receptor signaling and NF- κ B activation in a human monocyte cell line. *PLoS ONE*, 9(2), 1–8. <https://doi.org/10.1371/journal.pone.0089036>
- Thergarajan, G., Kumar, S., Bhassu, S., Omar, S. F. B. S., & Rampal, S. (2019). Effect of *Blastocystis* sp. In dengue patients—Increase in the treatment cost and exacerbation of symptoms. *PLoS ONE*, 14(3), 1–10. <https://doi.org/10.1371/journal.pone.0211034>
- Tidjani Alou, M., Lagier, J. C., & Raoult, D. (2016). Diet influence on the gut microbiota and dysbiosis related to nutritional disorders. *Human Microbiome Journal*, 1, 3–11. <https://doi.org/10.1016/j.humic.2016.09.001>
- Timothy W. Hand*,1, Ivan Vujkovic-Cvijin2, Vanessa K. Ridaura2, and Yasmine Belkaid2, 3 R.K. (2016). Linking the microbiota, chronic disease and the immune system. *Physiology & Behavior*, 176(1), 139–148. <https://doi.org/10.1016/j.tem.2016.08.003>. Linking
- Tito, R. Y., Chaffron, S., Caenepeel, C., Lima-mendez, G., Wang, J., Vieira-silva, S., Falony, G., Hildebrand, F., Darzi, Y., Rymenans, L., Verspecht, C., Bork, P., Vermeire, S., Joossens, M., & Raes, J. (2019). *Population-level analysis of Blastocystis subtype prevalence and variation in the human gut microbiota*. 1180–1189. <https://doi.org/10.1136/gutjnl-2018-316106>
- Tito, R. Y., Chaffron, S., Caenepeel, C., Lima-Mendez, G., Wang, J., Vieira-Silva, S., Falony, G., Hildebrand, F., Darzi, Y., Rymenans, L., Verspecht, C., Bork, P., Vermeire, S., Joossens, M., & Raes, J. (2019). Population-level analysis of *Blastocystis* subtype prevalence and variation in the human gut microbiota. *Gut*, 68(7), 1180–1189. <https://doi.org/10.1136/gutjnl-2018-316106>
- Tong, H. Van, Luu, N. K., Son, H. A., Hoan, N. Van, Hung, T. T., Velavan, T. P., & Toan, N. L. (2017). Adiponectin and pro-inflammatory cytokines are modulated in Vietnamese patients with type 2 diabetes mellitus. *Journal of Diabetes Investigation*, 8(3), 295–305. <https://doi.org/10.1111/jdi.12579>
- Torgerson, P. R., Devleeschauwer, B., Praet, N., Speybroeck, N., Willingham, A. L., Kasuga, F., Rokni, M. B., Zhou, X. N., Fèvre, E. M., Srija, B., Gargouri, N., Fürst, T., Budke, C. M., Carabin, H., Kirk, M. D., Angulo, F. J., Havelaar, A., & de Silva, N. (2015). World Health Organization Estimates of the Global and Regional Disease Burden of 11 Foodborne Parasitic Diseases, 2010: A Data Synthesis. *PLoS Medicine*, 12(12), 1–22. <https://doi.org/10.1371/journal.pmed.1001920>
- Vargas-Sanchez, G. B., Romero-Valdovinos, M., Ramirez-Guerrero, C., Vargas-Hernandez, I., Ramirez-Miranda, M. E., Martinez-Ocaña, J., Valadez, A., Ximenez, C., Lopez-Escamilla, E., Hernandez-Campos, M. E., Villalobos, G., Martinez-Hernandez, F., & Maravilla, P. (2015). *Blastocystis* isolates from patients with irritable bowel syndrome and from asymptomatic carriers exhibit similar parasitological loads, but significantly different generation times and

- genetic variability across multiple subtypes. *PLoS ONE*, 10(4), 1–13. <https://doi.org/10.1371/journal.pone.0124006>
- Vega, L., Herrera, G., Muñoz, M., Patarroyo, M. A., & Ramírez, J. D. (2020). Occurrence of *blastocystis* in patients with clostridioides difficile infection. *Pathogens*, 9(4). <https://doi.org/10.3390/pathogens9040283>
- Venegas, D. P., De La Fuente, M. K., Landskron, G., González, M. J., Quera, R., Dijkstra, G., Harmsen, H. J. M., Faber, K. N., & Hermoso, M. A. (2019). Short chain fatty acids (SCFAs) mediated gut epithelial and immune regulation and its relevance for inflammatory bowel diseases. *Frontiers in Immunology*, 10(MAR). <https://doi.org/10.3389/fimmu.2019.00277>
- Vogelberg, C., Stensvold, C. R., Monecke, S., Ditzen, A., Stopsack, K., Heinrich-Gräfe, U., & Pöhlmann, C. (2010). *Blastocystis* sp. subtype 2 detection during recurrence of gastrointestinal and urticarial symptoms. *Parasitology International*, 59(3), 469–471. <https://doi.org/10.1016/j.parint.2010.03.009>
- Wake, A. D. (2020). Antidiabetic effects of physical activity: How it helps to control type 2 diabetes. *Diabetes, Metabolic Syndrome and Obesity*, 13, 2909–2923. <https://doi.org/10.2147/DMSO.S262289>
- Waly, W. R., Ismail, M. A. G. M., Abu-Sarea, E. Y., & Abd El Wahab, W. M. (2021). Intestinal parasitic infections and associated risk factors in diabetic patients: a case-control study. *Journal of Parasitic Diseases*, 45(4), 1106–1113. <https://doi.org/10.1007/s12639-021-01402-0>
- Wang, D., Liu, J., Zhou, L., Zhang, Q., Li, M., & Xiao, X. (2022). Effects of Oral Glucose-Lowering Agents on Gut Microbiota and Microbial Metabolites. *Frontiers in Endocrinology*, 13(July), 1–16. <https://doi.org/10.3389/fendo.2022.905171>
- Wang, Jiajia, Li, W., Wang, C., Wang, L., He, T., Hu, H., Song, J., Cui, C., Qiao, J., Qing, L., Li, L., Zang, N., Wang, K., Wu, C., Qi, L., Ma, A., Zheng, H., Hou, X., Liu, F., & Chen, L. (2020). Enterotype Bacteroides Is Associated with a High Risk in Patients with Diabetes: A Pilot Study. *Journal of Diabetes Research*, 2020. <https://doi.org/10.1155/2020/6047145>
- Wang, Jingjing, Tang, H., Zhang, C., Zhao, Y., Derrien, M., Rocher, E., Van-Hylckama Vlieg, J. E., Strissel, K., Zhao, L., Obin, M., & Shen, J. (2015). Modulation of gut microbiota during probiotic-mediated attenuation of metabolic syndrome in high fat diet-fed mice. *ISME Journal*, 9(1), 1–15. <https://doi.org/10.1038/ismej.2014.99>
- Wang, Jun, Qin, J., Li, Y., Cai, Z., Li, S., Zhu, J., Zhang, F., Liang, S., Zhang, W., Guan, Y., Shen, D., Peng, Y., Zhang, D., Jie, Z., Wu, W., Qin, Y., Xue, W., Li, J., Han, L., ... Wang, J. (2012). A metagenome-wide association study of gut microbiota in type 2 diabetes. *Nature*, 490(7418), 55–60. <https://doi.org/10.1038/nature11450>

- Wang, Yong, Huang, J. M., Zhou, Y. L., Almeida, A., Finn, R. D., Danchin, A., & He, L. S. (2020). Phylogenomics of expanding uncultured environmental Tenericutes provides insights into their pathogenicity and evolutionary relationship with *Bacilli*. *BMC Genomics*, 21(1), 1–12. <https://doi.org/10.1186/s12864-020-06807-4>
- Wang, Yongjie, Che, M., Xin, J., Zheng, Z., Li, J., & Zhang, S. (2020). The role of IL-1 β and TNF- α in intervertebral disc degeneration. *Biomedicine and Pharmacotherapy*, 131(August), 110660. <https://doi.org/10.1016/j.biopha.2020.110660>
- Wensel, C. R., Pluznick, J. L., Salzberg, S. L., & Sears, C. L. (2022). Next-generation sequencing: insights to advance clinical investigations of the microbiome. *Journal of Clinical Investigation*, 132(7), 1–12. <https://doi.org/10.1172/JCI154944>
- Winter, S. E., & Bäumler, A. J. (2014). Why related bacterial species bloom simultaneously in the gut: Principles underlying the “like will to like” concept. *Cellular Microbiology*, 16(2), 179–184. <https://doi.org/10.1111/cmi.12245>
- Wu, H., Esteve, E., Tremaroli, V., Khan, M. T., Caesar, R., Mannerås-Holm, L., Ståhlman, M., Olsson, L. M., Serino, M., Planas-Fèlix, M., Xifra, G., Mercader, J. M., Torrents, D., Burcelin, R., Ricart, W., Perkins, R., Fernández-Real, J. M., & Bäckhed, F. (2017). Metformin alters the gut microbiome of individuals with treatment-naïve type 2 diabetes, contributing to the therapeutic effects of the drug. *Nature Medicine*, 23(7), 850–858. <https://doi.org/10.1038/nm.4345>
- Wutthi-in, M., Cheevadhanarak, S., Yasom, S., Kerdphoo, S., Thiennimitr, P., Phrommintikul, A., Chattipakorn, N., Kittichotirat, W., & Chattipakorn, S. (2020). Gut Microbiota Profiles of Treated Metabolic Syndrome Patients and their Relationship with Metabolic Health. *Scientific Reports*, 10(1), 1–11. <https://doi.org/10.1038/s41598-020-67078-3>
- Xue, Z., Kable, M. E., & Marco, M. L. (2018). Impact of DNA Sequencing and Analysis Methods on 16S rRNA Gene Bacterial Community Analysis of Dairy Products. *MSphere*, 3(5), 1–14. <https://doi.org/10.1128/msphere.00410-18>
- Yakoob, J., Abbas, Z., Usman, M. W., Sultana, A., Islam, M., Awan, S., Ahmad, Z., Hamid, S., & Jafri, W. (2014). Cytokine changes in colonic mucosa associated with Blastocystis spp. subtypes 1 and 3 in diarrhoea-predominant irritable bowel syndrome. *Parasitology*, 141(7), 957–969. <https://doi.org/10.1017/S003118201300173X>
- Yañez, C. M., Hernández, A. M., Sandoval, A. M., Domínguez, M. A. M., Muñiz, S. A. Z., & Gómez, J. O. G. (2021). Prevalence of Blastocystis and its association with Firmicutes/Bacteroidetes ratio in clinically healthy and metabolically ill subjects. *BMC Microbiology*, 21(1), 1–11. <https://doi.org/10.1186/s12866-021-02402-z>

- Yang, K., Xu, S., Zhao, H., Liu, L., Lv, X., & Hu, F. (2021). International Immunopharmacology induce NLRP3 inflammasome activation in human gingival fibroblasts. *International Immunopharmacology*, 94(September 2020), 107456. <https://doi.org/10.1016/j.intimp.2021.107456>
- Yason, J. A., Liang, Y. R., Png, C. W., Zhang, Y., Shyong, K., & Tan, W. (2019). Interactions between a pathogenic *Blastocystis* subtype and gut microbiota : in vitro and in vivo studies. 1–13.
- Yoshikawa, H., Tokoro, M., Nagamoto, T., Arayama, S., Asih, P. B. S., Rozi, I. E., & Syafruddin, D. (2016). Molecular survey of *Blastocystis* sp. from humans and associated animals in an Indonesian community with poor hygiene. *Parasitology International*, 65(6), 780–784. <https://doi.org/10.1016/j.parint.2016.03.010>
- Zanetti, A. D. S., Malheiros, A. F., de Matos, T. A., Longhi, F. G., Moreira, L. M., Silva, S. L., Castrillon, S. K. I., Ferreira, S. M. B., Ignotti, E., & Espinosa, O. A. (2020). Prevalence of *Blastocystis* sp. infection in several hosts in Brazil: a systematic review and meta-analysis. *Parasites & Vectors*, 13(1), 30. <https://doi.org/10.1186/s13071-020-3900-2>
- Zhai, Z., Zhang, F., Cao, R., Ni, X., Xin, Z., Deng, J., Wu, G., Ren, W., Yin, Y., & Deng, B. (2019). Cecropin A alleviates inflammation through modulating the gut microbiota of C57BL/6 mice with DSS-induced IBD. *Frontiers in Microbiology*, 10(JULY), 1–13. <https://doi.org/10.3389/fmicb.2019.01595>
- Zhang, Lijuan, Zhang, Y., Liu, J., Li, Y., & Quan, J. (2022). Association of Lipopolysaccharide-Toll-Like Receptor 4 Signaling and Microalbuminuria in Patients with Type 2 Diabetes Mellitus. *Diabetes, Metabolic Syndrome and Obesity*, 15(October), 3143–3152. <https://doi.org/10.2147/DMSO.S377776>
- Zhang, Lili, Chu, J., Hao, W., Zhang, J., Li, H., Yang, C., Yang, J., Chen, X., & Wang, H. (2021). Gut Microbiota and Type 2 Diabetes Mellitus: Association, Mechanism, and Translational Applications. *Mediators of Inflammation*, 2021. <https://doi.org/10.1155/2021/5110276>
- Zhang, W., Ren, G., Zhao, W., Yang, Z., Shen, Y., Sun, Y., Liu, A., & Cao, J. (2017). Genotyping of *Enterocytozoon bienersi* and subtyping of *Blastocystis* in cancer patients: Relationship to Diarrhea and assessment of zoonotic transmission. *Frontiers in Microbiology*, 8(SEP). <https://doi.org/10.3389/fmicb.2017.01835>
- Zhang, Zewen, Tian, T., Chen, Z., Liu, L., Luo, T., & Dai, J. (2021). Characteristics of the gut microbiome in patients with prediabetes and type 2 diabetes. *PeerJ*, 9. <https://doi.org/10.7717/peerj.10952>
- Zhang, Zhi, Cheng, L., & Ning, D. (2023). Gut microbiota and sepsis: bidirectional Mendelian study and mediation analysis. *Frontiers in Immunology*, 14(August), 1–10. <https://doi.org/10.3389/fimmu.2023.1234924>

- Zhao, L., Lou, H., Peng, Y., Chen, S., Zhang, Y., & Li, X. (2019). Comprehensive relationships between gut microbiome and faecal metabolome in individuals with type 2 diabetes and its complications. *Endocrine*, 66(3), 526–537. <https://doi.org/10.1007/s12020-019-02103-8>
- Zhao, X., Zhang, Y., Guo, R., Yu, W., Zhang, F., Wu, F., & Shang, J. (2020). The Alteration in Composition and Function of Gut Microbiome in Patients with Type 2 Diabetes. *Journal of Diabetes Research*, 2020. <https://doi.org/10.1155/2020/8842651>
- Zhou, Q., Ge, Q., Ding, Y., Qu, H., Wei, H., Wu, R., Yao, L., Wei, Q., Feng, Z., Long, J., & Deng, H. (2018). Relationship between serum adipsin and the first phase of glucose-stimulated insulin secretion in individuals with different glucose tolerance. *Journal of Diabetes Investigation*, 9(5), 1128–1134. <https://doi.org/10.1111/jdi.12819>
- Zhou, Z., Sun, B., Yu, D., & Zhu, C. (2022). Gut Microbiota: An Important Player in Type 2 Diabetes Mellitus. *Frontiers in Cellular and Infection Microbiology*, 12(February), 1–15. <https://doi.org/10.3389/fcimb.2022.834485>
- Zibaei, M., Bahadory, S., Saadati, H., Pourrostami, K., Firoozeh, F., & Foroutan, M. (2023). Intestinal parasites and diabetes: A systematic review and meta-analysis. *New Microbes and New Infections*, 51, 101065. <https://doi.org/10.1016/j.nmni.2022.101065>
- Zierdt, C. H. (1991). *Blastocystis hominis*-Past and Future. 4(1), 61–79.
- Zulfa, F., Sari, I. P., & Kurniawan, A. (2017). Association of *Blastocystis* subtypes with diarrhea in children. *Journal of Physics: Conference Series*, 884(1). <https://doi.org/10.1088/1742-6596/884/1/012031>