|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 1 Studies reporting on the beneficial effects of the administration of pasteurized A. muciniphila or its components.** | | | | |
| **Administered of Product** | **Mechanism of Action** | **Setting** | **Results** | **Reference** |
| Pasteurized A. muciniphila or the outer membrane protein Amuc\_1110 | * Expansion of cytotoxic T-lymphocytes in the colon and mesenteric lymph nodes * Reduction in macrophage and CD8+ cytotoxic T lymphocyte levels in the colon of mice with DSS-induced colitis * Reduction in markers of DNA damage; cell apoptosis; abnormal proliferation of colonic epithelial cells | Mice with DSS-induced colitis and CAC | * Improvement of CAC symptoms; delayed tumor development; decreased number and area of tumor lesions. * Amelioration of colitis symptoms; improvement of histologic damage | Wang L. et al. 2020 |
| Amuc\_2109 (a β-acetylaminohexosidase secreted by A. muciniphila) | * Enhanced gut barrier function * Reshaped gut microbiota. * Reduced expression of pro-inflammatory cytokines | Mice with DSS-induced colitis | * Amelioration of colitis symptoms. | Qian K. et al. 2022 |
| Amuc\_1434 (a recombinant enzyme derived from A. muciniphila able to degrade Muc2) | * Enhanced TRAIL-mediated apoptosis pathway. * Enhanced expression of p53, resulting in blockade of G0/G1 cell cycle phase | LS174T cancer cells | * Inhibition of proliferation and enhanced apoptosis of LS174T cells in vitro. | Meng X. et al. 2020 |
| Akk-Evs | * Increased infiltration of GZMB+, IFN-γ+ CD8+ lymphocytes, and M1 macrophages in tumour tissue. | PCa-bearing mice | * Reduced tumor burden | Luo Z. et al. 2021 |
| Three strains of pasteurized A. muciniphila with anti-lipogenic activity in vitro | * Increased expression of IRS-1; reduced expression of leptin gene in adipose tissue * Increased gut production of GLP-1 and PYY * Inhibition of low-grade intestinal inflammation, restoration of damaged gut integrity * Reduced expression of perilipin-2 (a protein involved in the regulation of lipolysis) in adipose tissues * Reduced expression of lipogenic-adipogenic markers (as PPARγ) in adipose tissue and liver | HFD-fed mice | * Three strains of pasteurized A. muciniphila with anti-lipogenic activity in vitro | Yang M. et al. 2020 |
| Pasteurized A. muciniphila | * Reduced expression of gut GLUT2, GLUT5, and SGLT1 with consequent decrease in carbohydrate absorption * Reduced expression of perilipin-2 (a protein involved in the regulation of lipolysis) in adipose tissues | HFD-fed mice | * Reduced body and fat mass weight. | Depommier C. et al.2020 |
| Live and pasteurized A. muciniphila and its EVs | * Reshaped gut microbiota. * Reduced expression of TLR2 and TLR4 in HSC * Enhanced gut barrier function | Quiescent and LPS-activated HSC and HFD-fed mice treated with CCl4 | * Amelioration of liver biochemistry * Reduced expression of fibrosis and inflammatory * Reduced expression of fibrosis markers via activated HSC * Attenuation of liver histopathological damage | Raftar S. et al. 2020 |

|  |  |  |
| --- | --- | --- |
| **Table 2 Clinical development in different stages** | | |
| **Condition** | **Clinical Development Utilising A. muciniphila** | **Reference** |
| Crohn’s disease | A. muciniphila's capacity to repair the intestinal barrier and lower inflammation has made it a promising therapeutic target for Crohn's disease. | Zheng et al., 2023 |
| Breast Milk | A. muciniphila's function in the composition of breast milk and its possible advantages for a baby's gut health, including the development of the immune system and defence against infections, have been studied. | Kostopoulos et al., 2020 |
| Cystic fibrosis | The effects of A. muciniphila supplementation on the makeup of the gut microbiota and general health in people with cystic fibrosis are still being studied. | Wang et al., 2023 |
| Cancer | According to preliminary research, A. muciniphila may function in cancer therapy, especially if it helps improve immunotherapy response and alter the tumour microenvironment. | Pellegrino et al., 2023 |
| Obesity | Due to its ability to lower inflammation in adipose tissue and improve metabolic parameters, A. muciniphila has drawn interest for its anti-obesity qualities. | Xu et al., 2020 |