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|  **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 |

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| **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 |