

# Pubmed web crawler coding challenge

Search keywords from the two list giving below on pubmed together, and then store all the returning papers' title, abstract and PMID (DOI number if it exists). In addition, please change the display settings from 20 to the maximum papers per page to facilitate the crawling efficiency.

Note: Consider the situation when there is no returning results.













## Example:

**Input list 1:** [Akkermansia, Blastocatellaceae, Flavobacteriia]

**Input list 2:** [leukaemia, T2D, Crohn's disease, ulcerative colitis]

## Output:

1. All the searched term pair will generate a file which contains the extracted information

	Bacteroidetes+T2D_information.txt		Today at 5:12 PM	31 KB	Plain Text
	Bacteroidetes+Crohn%E2%80%99s%20disease_information.txt		Today at 5:12 PM	Zero bytes	Plain Text
	Bacteroidetes+leukaemia_information.txt		Today at 5:10 PM	64 KB	Plain Text
	Akkermansia+ulcerative%20colitis_information.txt		Today at 5:06 PM	16 KB	Plain Text
	Akkermansia+Crohn%E2%80%99s%20disease_information.txt		Today at 5:06 PM	13 KB	Plain Text
	Akkermansia+T2D_information.txt		Today at 5:05 PM	15 KB	Plain Text

2. Each file will contains the entire extracted results, feel free to do some further modification.

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1 Paper title: A dietary intervention with functional foods reduces metabolic endotoxaemia and attenuates biochemical abnormalities by modifying faecal microbiota in people
with type 2 diabetes.
2 Paper Abstract: To study the effects of a functional food-based dietary intervention on faecal microbiota and biochemical parameters in patients with type 2 diabetes (T2D).
3 Paper PMID: 30266575
4 Paper PMID or DOI: 10.1016/j.jdiabet.2018.09.004
5
6 Paper Title: Understanding the Representative Gut Microbiota Dysbiosis in Metformin-Treated Type 2 Diabetes Patients Using Genome-Scale Metabolic Modeling.
7 Paper Abstract: Dysbiosis in the gut microbiome composition may be promoted by therapeutic drugs such as metformin, the world's most prescribed antidiabetic drug. Under
metformin treatment, disturbances of the intestinal microbes lead to increased abundance of
8 Paper PMID: 29988585
9 Paper PMID or DOI: PMC6026676
10
11 Paper Title: Prebiotic Mannan-Oligosaccharides Augment the Hypoglycemic Effects of Metformin in Correlation with Modulating Gut Microbiota.
12 Paper Abstract: Type 2 diabetes (T2D) induced by obesity and high-fat diet is significantly associated with gut microbiota dysbacteriosis. Because the first line clinical
medicine of metformin has several intestinal drawbacks, combination usage of metformin with a prebiotic of konjac mannan-oligosaccharides (MOS) was conceived and implemented
aiming to investigate whether there were some intestinal synergetic effects and how MOS would function. Composite treatment of metformin and MOS demonstrated synergistic
effects on ameliorating insulin resistance and glucose tolerance, also on repairing islet and hepatic histology. In addition, MF+MOS altered the gut community composition and
structure by decreasing the relative abundances of family Rikenellaceae and order Clostridiales while increasing an unnamed OTU05945 of family S24-7, Akkermansia muciniphila,
and Bifidobacterium pseudolongum. The present study suggested that usage of MOS could augment the hypoglycemic effects of metformin in association with gut microbiota
modulation, which could provide references for further medication.
13 Paper PMID: 29701959
14 Paper PMID or DOI: 10.1021/acs.jafc.8b00829
15
16 Paper Title: Metformin: old friend, new ways of action-implication of the gut microbiome?
17 Paper Abstract: Gut dysbiosis was recently associated with the occurrence of type 2 diabetes (T2D). In addition to this finding, an increasing number of studies performed upon
the last 5 years have also shown that metformin treatment leads to changes in gut bacterial composition in diabetic patients. This review focuses on the articles describing the
effects of metformin on gut homeostasis (including the gut microbiota) and proposes potential mechanisms involved in those effects.
18 Paper PMID: 29634493
19 Paper PMID or DOI: 10.1097/MCO.0000000000000468
20
21 Paper Title: Akkermansia muciniphila-derived extracellular vesicles influence gut permeability through the regulation of tight junctions.
22 Paper Abstract: The gut microbiota has an important role in the gut barrier, inflammation and metabolic functions. Studies have identified a close association between the
intestinal barrier and metabolic diseases, including obesity and type 2 diabetes (T2D). Recently, Akkermansia muciniphila has been reported as a beneficial bacterium that
reduces gut barrier disruption and insulin resistance. Here we evaluated the role of A. muciniphila-derived extracellular vesicles (AmEVs) in the regulation of gut permeability.
We found that there are more AmEVs in the fecal samples of healthy controls compared with those of patients with T2D. In addition, AmEV administration enhanced tight junction
function, reduced body weight gain and improved glucose tolerance in high-fat diet (HFD)-induced diabetic mice. To test the direct effect of AmEVs on human epithelial cells,
cultured Caco-2 cells were treated with these vesicles. AmEVs decreased the gut permeability of lipopolysaccharide-treated Caco-2 cells, whereas Escherichia coli-derived EVs
had no significant effect. Interestingly, the expression of occludin was increased by AmEV treatment. Overall, these results imply that AmEVs may act as a functional moiety for
controlling gut permeability and that the regulation of intestinal barrier integrity can improve metabolic functions in HFD-fed mice.
23 Paper PMID: 29472701
24 Paper PMID or DOI: PMC5903829
25
26 Paper Title: Balancing Herbal Medicine and Functional Food for Prevention and Treatment of Cardiometabolic Diseases through Modulating Gut Microbiota.
27 Paper Abstract: It has become apparent that gut microbiota is closely associated with cardiometabolic diseases (CMDs), and alteration in microbiome compositions is also linked
to the host environment. Next generation sequencing (NGS) has facilitated in-depth studies on the effects of herbal medicine and functional food on gut microbiota. Both herbal
medicine and functional food contain fiber, polyphenols and polysaccharides, exerting prebiotics-like activities in the prevention and treatment of CMDs. The administrations of
herbal medicine and functional food lead to increased the abundance of phylum Bacteroidetes, and genus
28 Paper PMID: 29167659
29 Paper PMID or DOI: PMC5682319
30
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