電子ジャーナルで論文を探しみよう！
-PubMed-

PubMedで
次の条件に合う論文を探してみよう。

＞キーワード:「fucoidan」「cancer」

検索結果の画面にAbstract(抄録)を
表示してみよう

PubMed

- 医学系、生命科学系学術雑誌に掲載された論文を検索できる
- 1946年～現在まで収録
- 無料のデータベースなのでどこからでも利用できる。北大図書館の「データベース一覧」から利用すると論文の本文へのリンクも表示できる。

キーワード入力のポイント

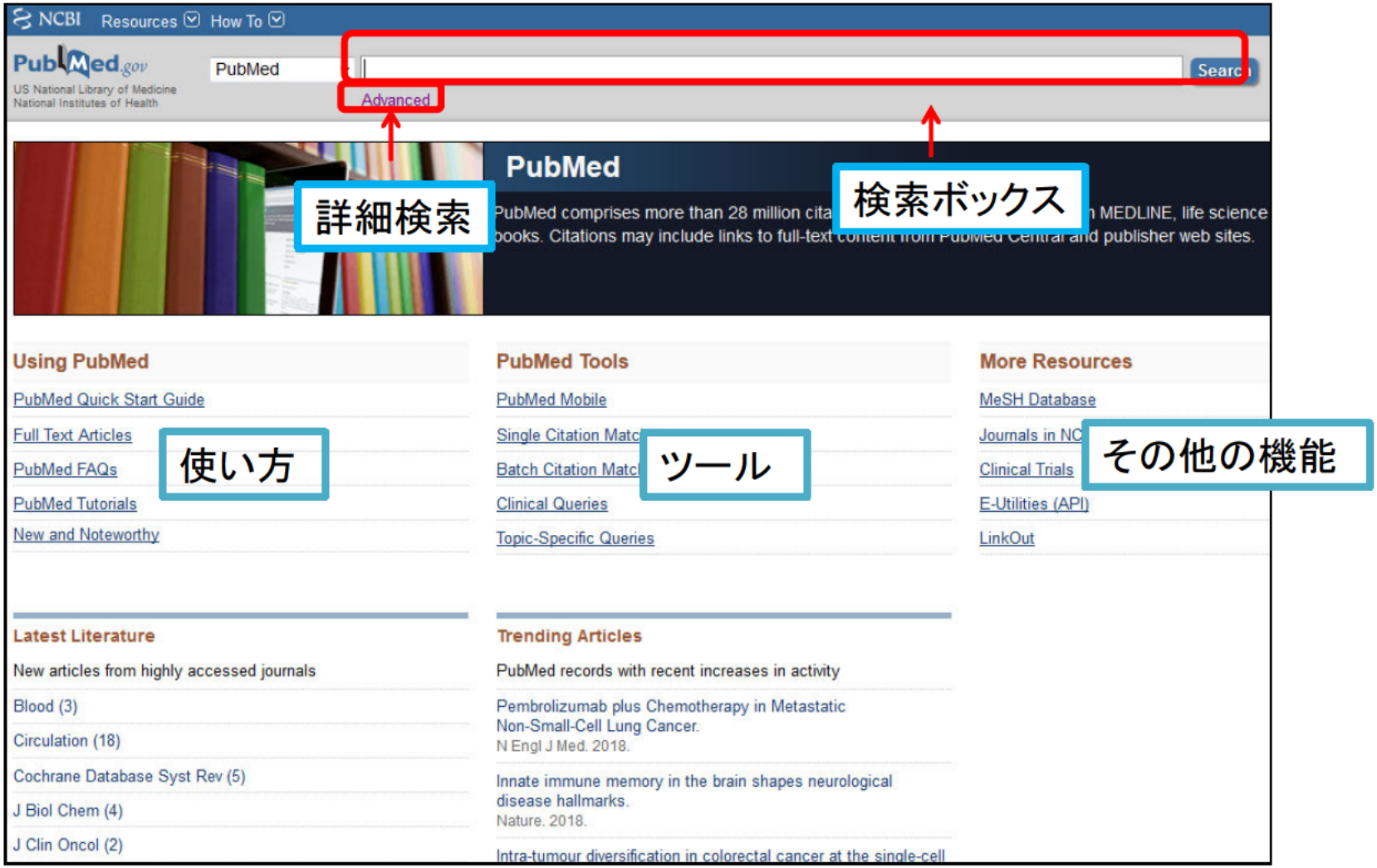
1. 曖昧な語の検索：前方一致検索＝語尾に＊をつける
   例） librar* → library, librarian, librarians, …
2. 熟語の検索：ダブルクォーテーション「”」でくくる
   例）“fish oil” “lung cancer”
3. 著者名の検索：姓＋名＋ミドルネーム　名とミドルネームはイニシャルのみ　　例）Smith R ／ suzuki a
   ※2002年以降出版の文献はフルネームで検索可能
4. 雑誌名の検索：完全な雑誌名、略誌名のいずれからも検索
   例）「CBP」でも「Comparative Biochemistry and Physiology」でも同じ結果
5. キーワードや条件の掛け合わせ（論理演算）
   「AND」（両方の語を含む）「 OR」（どちらかの語を含む）「NOT」（前者を含むが後者を含まない）などでつなぐ（スペースで区切ると自動的にAND検索、入力は大文字で）

PubMedで調べる1

目標④： キーワード:「fucoidan」＋「cancer」

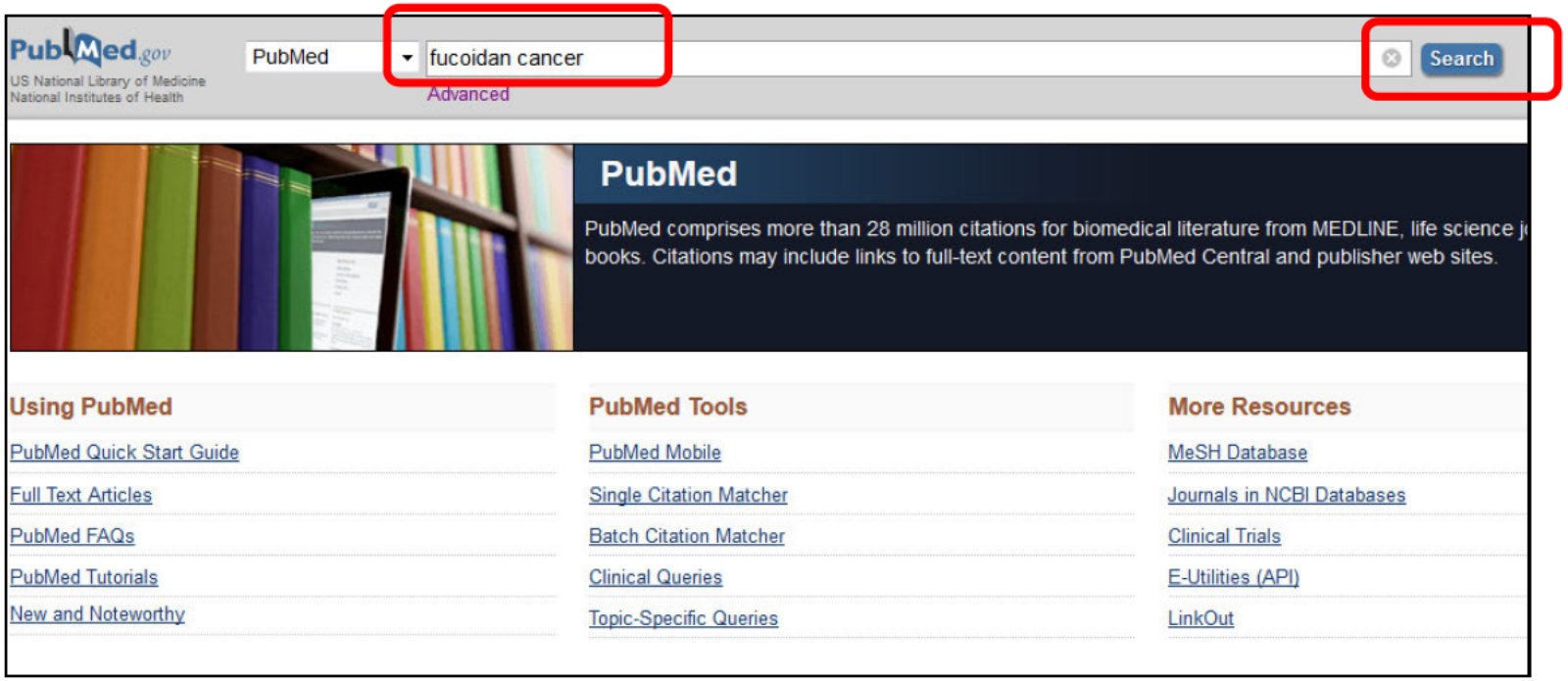
PubMedで調べる2

目標④： キーワード：「fucoidan」＋「cancer」



PubMedで調べる3

目標④： キーワード:「fucoidan」＋「cancer」



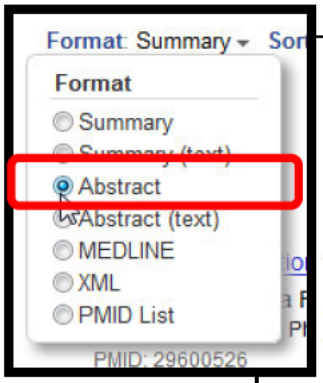
「fucoidan　cancer」
で検索

PubMedで調べる4

目標④： キーワード:「fucoidan」＋「cancer」

PubMedで調べる5

目標④： キーワード：「fucoidan」＋「cancer」



Biol Pharm Bull. 2019;42(3):442-447. doi: 10.1248/bpb.b18-00777.

Fucoidan Promotes Apoptosis and Inhibits EMT of Breast Cancer Cells.

He X[1,2,3], Xue M[4], Jiang S[5], Li W[4], Yu J[2], Xiang S[4].

Author information

Abstract

Fucoidan is an active component of seaweed, and could inhibit proliferation and induce apoptotic cell death in several tumor cells. However, the function of fucoidan in breast cancer is largely unknown. In the present study, we evaluated the anti-cancer potential of fucoidan in human breast cancer MCF-7 cells. Adult Sprague-Dawley rats were randomized to receive fucoidan (200 or 400 mg/kg·body weight per day) or normal saline via gastric gavage for 3 consecutive days. Serum samples were prepared from these rats, and used for subsequent experiments to examine the potential effects in MCF-7 cells. Cell viability was determined using a 3-(4,5-dimethyl-2-thiazolyl)-2,5-diphenyl-2H-tetrazolium bromide (MTT) assay. Apoptosis was examined with Hoechst33258 staining and flow cytometry. Cell migration and invasion were measured by wound scratch assay and Transwell assay, respectively. Western blot and enzyme-linked immunosorbent assay (ELISA) were used to examine the expression of secretory E-cadherin and matrix metalloproteinase-9 (MMP-9). Conditioned serum from fucoidan-treated rats significantly suppressed cell proliferation and enhanced apoptosis. Cell migration and invasion were also significantly decreased. Observed effects of conditioned serum were associated with upregulation of E-cadherin and downregulation of MMP-9. Conditioned serum of rats treated with fucoidan could inhibit the proliferation and promote apoptosis of MCF-7 cells. Cell invasion and migration were inhibited, possibly via decreased epithelial-mesenchymal transition (EMT) process. Fucoidan may be a promising therapeutic agent for human breast cancers.

KEYWORDS: apoptosis; breast cancer cell; drug serum; epithelial–mesenchymal trans

PMID: 30828076 DOI: 10.1248/bpb.b18-00777

Free full text

Similar articles

収録誌の情報、DOI

論題、著者名

アブストラクト（抄録）とキーワード

PMIDとレコード状態

この例では「全文へのリンク」（J-Stage）をクリック

全文へのリンク

PubMedで調べる6

目標④： キーワード:「fucoidan」＋「cancer」

「Download PDF」をクリック

442 Biol. Pharm. Bull. 42, 442–447 (2019) Vol. 42, No. 3

Regular Article

Fucoidan Promotes Apoptosis and Inhibits EMT of Breast Cancer Cells

Xinjia He,[a,b,c,‡] Meilan Xue,[d,‡] Shu Jiang,[e] Weiwei Li,[d] Jinming Yu,[*,b] and Shuai Xiang[d]

[a]School of Medicine, Shandong University; Jinan, Shandong 250012, China: [b]Department of Radiation Oncology, Shandong Cancer Hospital Affiliated to Shandong University, Shandong Academy of Medical Sciences; 440 Jiyan Road, Jinan, Shandong 250117, China: [c]Department of Radiation Oncology, Affiliated Hospital of Qingdao University Medical College; Qingdao, Shandong 266021, China: [d]Department of Biochemistry and Molecular Biology, Basic Medical College, Qingdao University of Medicine; 38 Dengzhou Road, Qingdao, Shandong 266021, China: and [e]The Affiliated Hospital of Qingdao University; Qingdao, Shandong 266003, China.

Received October 5, 2018; accepted November 25, 2018

Fucoidan is an active component of seaweed, and could inhibit proliferation and induce apoptotic cell death in several tumor cells. However, the function of fucoidan in breast cancer is largely unknown. In the present study, we evaluated the anti-cancer potential of fucoidan in human breast cancer MCF-7 cells. Adult Sprague–Dawley rats were randomized to receive fucoidan (200 or 400 mg/kg·body weight per day) or normal saline via gastric gavage for 3 consecutive days. Serum samples were prepared from these rats, and used for subsequent experiments to examine the potential effects in MCF-7 cells. Cell viability was determined using a 3-(4,5-dimethyl-2-thiazolyl)-2,5-diphenyl-2*H*-tetrazolium bromide (MTT) assay. Apoptosis was examined with Hoechst33258 staining and flow cytometry. Cell migration and invasion were measured by wound scratch assay and Transwell assay, respectively. Western blot and enzyme-linked immunosorbent assay (ELISA) were used to examine the expression of secretory *E*-cadherin and matrix metalloproteinase-9 (MMP-9). Conditioned serum from fucoidan-treated rats significantly suppressed cell proliferation and enhanced apoptosis. Cell migration and invasion were also significantly decreased. Observed effects of conditioned serum were associated with upregulation of *E*-cadherin and downregulation of MMP-9. Conditioned serum of rats treated with fucoidan could inhibit the proliferation and promote apoptosis of MCF-7 cells. Cell invasion and migration were inhibited, possibly *via* decreased epithelial–mesenchymal transition (EMT) process. Fucoidan may be a promising therapeutic agent for human breast cancers.

Key words breast cancer cell; fucoidan; drug serum; apoptosis; epithelial–mesenchymal transition

INTRODUCTION

Fucoidan is composed of L-fucose, sulfate groups and other biologically active components such as D-xylose, D-mannose, D-galactose, L-rhamnose, arabinose, glucose, D-glucuronic acid and acetyl groups. It is primarily extracted from brown seaweeds and has been intensively studied due to its diverse biological properties, including antithrombotic, anticoagulant, antiviral and antitumor activities.[1,2]

Breast cancer is a heterogeneous disease with several defined molecular subgroups, more than one-and-half million new breast cancer cases are reported worldwide each year.[3–5] Unfortunately, most chemotherapeutic agents and hormonally directed drugs for breast cancer are designed to broadly target common deregulated mechanisms within breast cancer cells. Many healthy tissues are also affected and patients often experience clinically significant toxic effects. Subsequent studies demonstrated that fucoidan could induce cell cycle arrest in a chemoresistant non-small-cell bronchopulmonary carcinoma line.[6] Accumulating evidence has indicated that fucoidan could significantly suppress cell viability and promote apoptosis of cancer cells.[7,8] Fucoidan also has beneficial effects as it can resist toxicity associated with chemoradiotherapy.[9] Previous studies have demonstrated that fucoidan induced apoptosis of human breast cancer MCF-7 cells *via* activating caspase-8.[10] In addition, brown algae containing fucoidan is widely spread in resources, and in recent years has drawn intense research interests.

However, as a polysaccharide molecule, it is difficult to purify the fucoidan monomer, and the effect of the crude extract is not very precise when tested *in vitro*. The effects of fucoidan on the onset and progression of human breast cancer are still unelucidated. Therefore, in the present study, serum samples were obtained from female Sprague–Dawley (SD) rats, which were fed by fucoidan or an equivalent volume of normal saline, respectively. Serum from each group was incubated *in vitro* with MCF-7 cells to study the effect of fucoidan on the proliferation, migration and apoptosis of breast cancer cells.

MATERIALS AND METHODS

Cells Breast cancer MCF-7 cells (Shanghai Life Science of Chinese Academy of Sciences, Shanghai, China) were maintained in Dulbecco's modified Eagle's medium (DMEM) high glucose (0.45 g/L D-glucose; Hyclone Biotechnology, Beijing, China) supplemented with 10% heat-inactivated fetal bovine serum (FBS; Gibco; Thermo Fisher Scientific, Waltham, MA, U.S.A.) and 100 U/mL penicillin/0.1 mg/mL streptomycin at 37°C in a humidified atmosphere containing 5% CO_2.

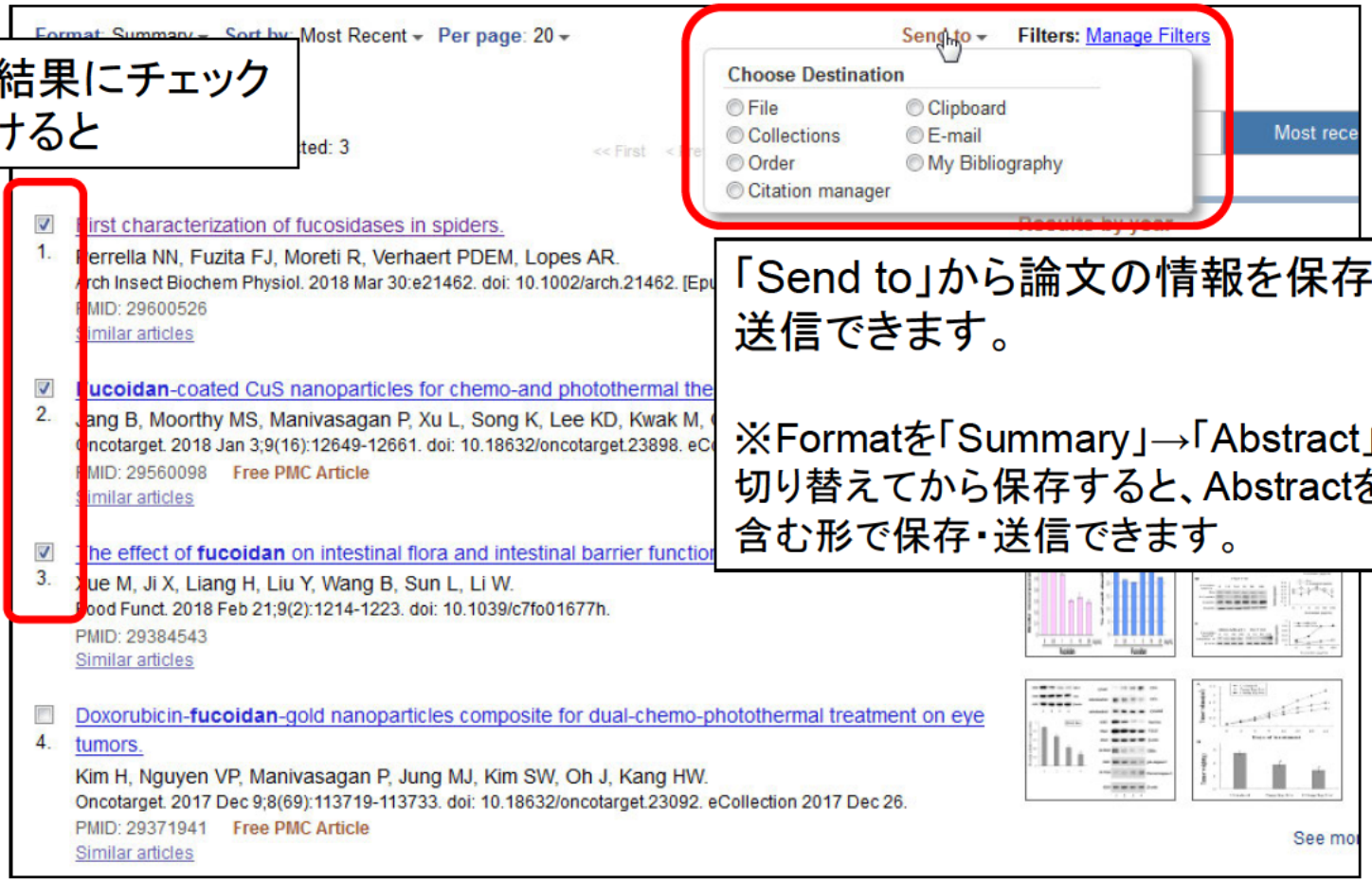
Animals Twenty adult female SD rats (2 months of age, weighing 120–160 g each; Shandong Lukang Pharmaceutical Co., Qingdao, China) were housed in a standard animal facility with free access to drinking water and natural light. The

‡These authors contributed equally to this work.

*To whom correspondence should be addressed. e-mail: yujm_sdmed@163.com

PubMedの調べ方捕足1

検索結果にチェック
をつけると



「Send to」から論文の情報を保存・送信できます。

※Formatを「Summary」→「Abstract」に切り替えてから保存すると、Abstractを含む形で保存・送信できます。

PubMedの調べ方補足2

＜MeSHを使った検索＞

MeSHとは米国国立医学図書館（NLM）が作成するシソーラスMedical Subject Headings（医学主題見出し）の略称

シソーラス・・・様々な医学用語を統一して上位語・下位語を整理した統制語辞書

例えば

癌について調べたい・・・

論文中の表現

cancer, tumor, neoplasm

・・・様々な表現が存在

MeSH → **neoplasms**

論文内容を表わす言葉として Mesh用語 "Neoplasms"を 付与しキーワードを統一

PubMedの参考資料

岩下愛，山下ユミ共著『図解PubMedの使い方 第6版』 日本医学図書館協会, 2013

→ 水産学部図書室の論文の書き方コーナー (490．7／IWA)にあり

アカデミックスキルガイド　3-18
「PubMedの使い方～MeSH編～」

→ 図書館のHP→「学習・教育支援情報」>「学習支援情報（本学学生向け）」>「 レポートを作成したい／勉強したい→学習に役立つサービス」>「学習サポート」 、にて公開。