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U OF ARKANSAS FOR MEDICAL SCIENCES

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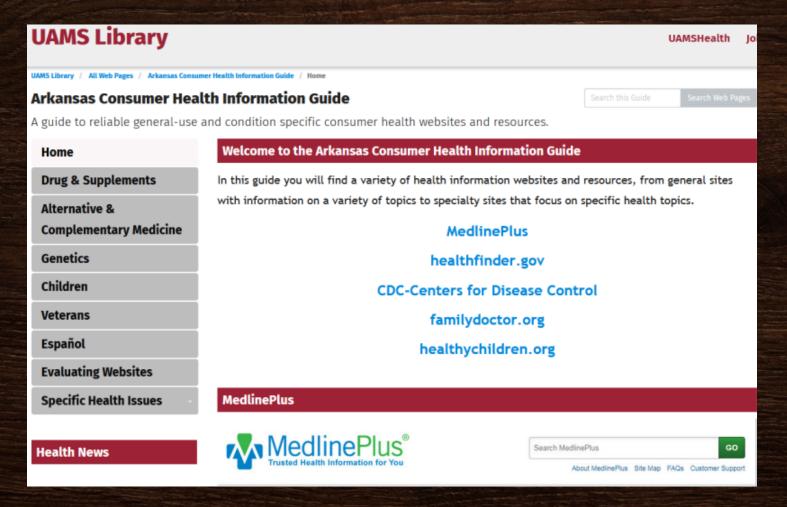
# Overview

- General Consumer Health
- Drug and Supplements
- Alternative and Complementary Medicine
- Genetics
- Tips for Evaluation of Online Resources

- Identify a variety of authoritative consumer health information websites.
- Navigate consumer health websites to find needed information.
- Analyze consumer health websites for usability and authority.

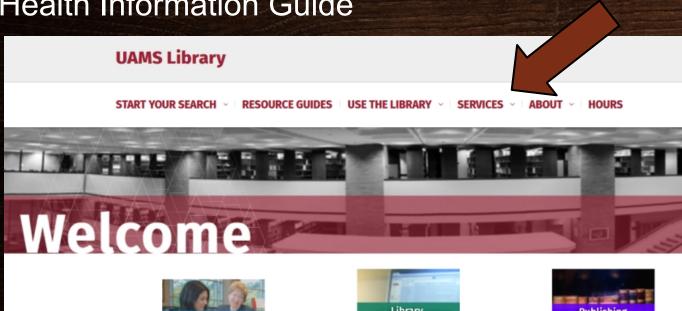
# Learning Objectives

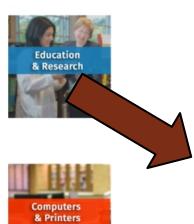
# Arkansas Consumer Health Information Guide



This is the <u>website</u> created specifically to help navigate through using and evaluating consumer health websites. There is a section for each piece that we will discuss today.

The guide can be located by going to <a href="https://libguides.uams.edu/ConsumerHealth">https://libguides.uams.edu/ConsumerHealth</a> or by going to the library website (<a href="http://library.uams.edu">http://library.uams.edu</a>) choosing Serving Arkansas and clicking the link to the Arkansas Consumer Health Information Guide













## **UAMS Library**

UAMS Library / All Web Pages / Services to the State

### **Services to the State**

Information about services the Libr

**Health Information for All** 

**Regional Center Libraries** 

Arkansas Children's Hospital Library Services

Arkansas Health Care Professionals

**General Public** 

Arkansas Consumer Health Information Guide

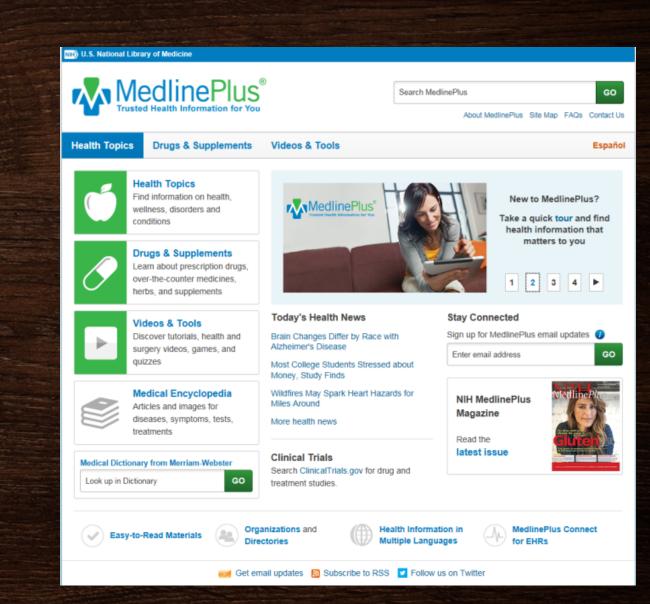
# General Consumer Health This section contains information about general health resources intended for the public.

## MedlinePlus:

http://www.medlineplus.gov

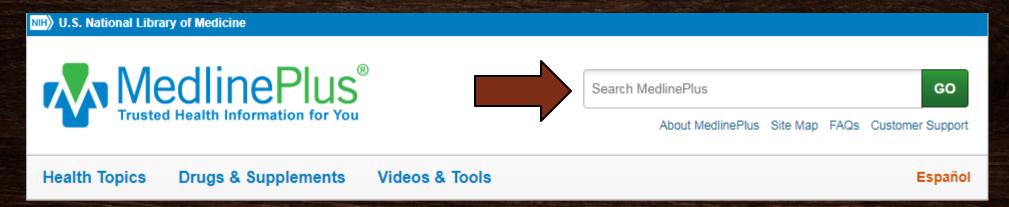
MedlinePlus has health topic pages, videos, drug information, games and other related topic resources.

MedlinePlus is created by the U.S. National Library of Medicine (NLM). It does <u>not</u> contain advertising.



# Searching for a topic

 To do a general search, use the search box in the top right of the page.



 You can find handouts, images, and videos on topics as well





flu X GO

About MedlinePlus Site Map FAQs Customer Support

**Health Topics** 

**Drugs & Supplements** 

Videos & Tools

Español

Home → Search Results

Search Help

### Refine by Type

### All Results (2,194)

- Health Topics (63)
- External Health Links (1.196)
- Drugs and Supplements (327)
- Medical Encyclopedia (231)
- MedlinePlus Magazine (41)
- Multiple Languages (47)
- National Institutes of Health (1

### <u>Flu</u>

Flu is a respiratory infection caused by a number of viruses. The viruses pass through the air and enter your body through your nose or mouth. Between 5% and 20% of people in the U.S. get the flu each year. The flu can be serious or even deadly for elderly people, newborn babies, and people with certain chronic illnesses.



Select this option to find information in other languages, when available

are worse than

### Refine by Format

### All Results (2,194)

- o PDF (94)
- Images (18)
- Videos (10)

### Results 1 - 10 of 1,948 for flu

1. Flu (National Library of Medicine)

**Flu** is a respiratory infection caused by a number of viruses. The viruses pass through the air ... 20% of people in the U.S. get the **flu** each year. The **flu** can be serious or ... https://medlineplus.gov/flu.html - Health Topics

2. H1N1 Flu (Swine Flu) (National Library of Medicine)

 This section shows everything available on the health topic chosen



Search MedlinePlus

GO

About MedlinePlus Site Map FAQs Customer Support

**Health Topics** 

**Drugs & Supplements** 

Videos & Tools

Español

Home → Health Topics → Flu

### Flu

Also called: Grippe, Influenza

All information can be printed or emailed











### On this page

### Basics

- Summary
- Start Here
- Symptoms
- Diagnosis and Tests
- Prevention and Risk Factors
- Treatments and Therapies

### Learn More

- Living With
- Related Issues
- Specifics

### See, Play and Learn

- Images
- Health Check Tools

### Research

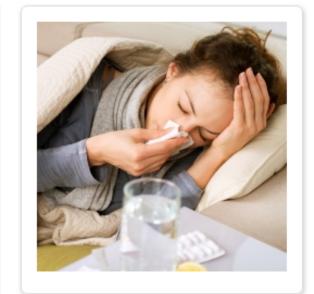
- Statistics and Research
- Clinical Trials
- Journal Articles

### Resources

Find an Expert

### For You

- Children
- Teenagers
- Women
- Seniors
- Patient Handouts



**Stay Connected** 

# Links to Reliable Sites

 MedlinePlus has many links to other websites

 All links have been vetted so only authoritative sites are included

 After each link the name of the organization that produces the website is indicated

### Start Here

- . Colds and the Flu (American Academy of Family Physicians)
- Influenza (Flu) (Mayo Foundation for Medical Education and Research)
- Key Facts about Influenza (Flu) and Flu Vaccine (Centers for Disease Control and Prevention)
- Seasonal Influenza Questions & Answers (Centers for Disease Control and Prevention)

### **Symptoms**

Flu Symptoms & Complications (Centers for Disease Control and Prevention)
 Also in Spanish

### **Diagnosis and Tests**

- Cold, Flu, or Allergy? Know the Difference for Best Treatment (National Institutes of Health)
   Also in Spanish
- Diagnosing Flu (Centers for Disease Control and Prevention)
   Also in Spanish
- Flu (Influenza) Test NH (National Library of Medicine)
   Also in Spanish

### **Prevention and Risk Factors**

- Flu & You: Preventive Steps (Centers for Disease Control and Prevention)
   Also in Spanish
- Influenza Prevention: Information for Travelers (Centers for Disease Control and Prevention)
   Also in Spanish

u (American Academy of Family Physicians)

Also in Spanish

 Preventing the Flu: Good Health Habits Can Help Stop Germs (Centers for Disease Control and Prevention)
 Also in Spanish

# Alternative Search Options

 You can also find topics by clicking Health Topics

 You can search on the A-Z list or by body location, disease, or group





Search MedlinePlus

GO

About MedlinePlus Site Map FAQs Customer Support

**Health Topics** 

**Drugs & Supplements** 

Videos & Tools

Español

Home → Health Topics

### **Health Topics**









Read about symptoms, causes, treatment and prevention for over 1000 diseases, illnesses, health conditions and wellness issues. MedlinePlus health topics are regularly reviewed, and links are updated daily.

### Find topics A-Z

A B C D E F G H I J K L M N O P Q R S T U V W XYZ List of All Topics

### **Body Location/Systems**



Blood, Heart and Circulation



Bones, Joints and Muscles



Brain and Nerves



Digestive System



Ear, Nose and Throat



Endocrine System



Eyes and Vision



Immune System

### **Disorders and Conditions**

### Cancers

### Genetics/Birth Defects

Diabetes Mellitus

### Infections

Injuries and Wounds

Mental Health and Behavior

Metabolic Problems

Poisoning, Toxicology, Environmental Health

Pregnancy and Reproduction

Substance Abuse Problems

### **Demographic Groups**

Children and Teenagers

Men

Population Groups

Seniors

Women

### **Health and Wellness**

Disasters

Fitness and Exercise

Food and Nutrition

# Alternative Search Options

- You can find drug info using the link Drugs & Supplements
- In the alphabet list, you can search for the generic name or the brand name of a drug
- The patient can also find herbs and supplements for how they work, evidence of effectiveness, and if they will create problems with other drugs the patient is taking



Search MedlinePlus

GO

About MedlinePlus Site Map FAQs Customer Support

ealth T

**Drugs & Supplements** 

Videos & Tools

Español

Home → Drugs, Herbs and Supplements

### **Drugs, Herbs and Supplements**

### Drugs

Learn about your prescription drugs and over-the-counter medicines. Includes side effects, dosage, special precautions, and more.

Browse by generic or brand name:



For FDA approved labels included in drug packages, see DailyMed.

### Herbs and Supplements

Browse dietary supplements and herbal remedies to learn about their effectiveness, usual dosage, and drug interactions.



### All herbs and supplements

Prescription and over-the-counter medication information is from AHFS® Consumer Medication Information, copyrighted by the American Society of Health-System Pharmacists (ASHP), Inc., Bethesda, Maryland; Copyright © 2018. All Rights Reserved.









### **Related Topics**

HIV/AIDS Medicines

Antibiotics

Antidepressants

Blood Pressure Medicines

Blood Thinners

Cancer Alternative Therapies

Cancer Chemotherapy

Cold and Cough Medicines

# Other Ways to Use the Site

- MedlinePlus contains:
  - Videos
  - Calculators
  - Quizzes
  - Games
  - Tutorials
  - Podcasts



Search MedlinePlus GO

About MedlinePlus Site Map FAQs Customer Support

**Health Topics** 

**Drugs & Supplements** 

Videos & Tools

Español

Home → Videos & Tools

### Videos & Tools









Watch health videos on topics such as anatomy, body systems, and surgical procedures. Test your knowledge with interactive tutorials and games. Check your health with calculators and guizzes.



### **Health Videos**

View videos of anatomy and body systems and how diseases and conditions affect them.



### MedlinePlus Videos

View animated videos that explain topics in health and medicine.



### **Health Check Tools**

Check your health with interactive calculators, quizzes and questionnaires.



### Games

Boost your health knowledge by playing interactive health games.

### Search all Videos & Tutorials

Search all Videos & Tutorials

GO

**Understanding Medical Words Tutorial** 

**Evaluating Health Information Tutorial** 

To Your Health: NLM Update Podcast

# Healthfinder.g

https://healthfinder.gov/

Department of Health and Human Services together with other federal agencies. A key resource for prevention information.

Similar topics as MedlinePlus but with more of a focus on prevention



# Additional Consumer Health Resources

- MedlinePlus: https://medlineplus.gov
- Clinical Trials: https://clinicaltrials.gov
- Healthfinder.gov: https://healthfinder.gov/
- Center for Disease Control and Prevention: http://www.cdc.gov/
- <u>Familydoctor.org</u>: https://familydoctor.org/
- Healthychildren.org: https://www.healthychildren.org/
- National Library of Medicine: https://nlm.nih.gov/



# Drug Informatic Portal

https://druginfo.nlm.nih.gov/drugportal/drugportal.jsp

The Drug Information Portal provides a gateway to selected drug information from the National Library of Medicine and other United States government agencies.

### Drug Information Portal

Quick Access to Quality Drug Information





Home

News and Features

NLM Resources

NLM Research Resources Resources by Audience / Class Other Resources

Mobile Site



Information available for 70,707 drugs.



By Name

OBy Category



- ▶ Show examples.
- Show drug category names, results, and descriptions.
- ▶ Show top "By Name" searches (previous seven days).
- ▶ Show top "By Category" searches (previous seven days).
- ▶ Show top dispensed prescriptions in the US Market, 2010.
- Show common drug names list.
- Show generic name stems list.
- Show list of resources searched.

# Example Search Result

 Drug Information Portal links to other National Library of Medicine (NLM) sites

 Some links are for healthcare providers and others for patients and their families

### **Drug Information Portal**

Quick Access to Quality Drug Information



NLM Resources

Resources

Resources by Audience / Class Other Resources

Home → Search Results → Substance



By Name By Category



### Result

Drug Name: Oseltamivir [INN:BAN]

View Synonyms

View Structure

An acetamido cyclohexene that is a structural homolog of SIALIC ACID and inhibits NEURAMINIDASE. Description:

TAMIFLU

Categories: i Anti-Infective Agents

Show more categories



- Summary of drug information (MedlinePlusDrug)
- Summary of consumer health information (MedlinePlusTopics)
- Summary of the effect on breastfeeding (LactMed)
- Summary of Drug-Induced Liver Injury (LiverTox)
- Summary of drug information and clinical research (PubMed Health)
- Manufacturers drug label (DailyMed)
- ▶ i Clinical trials (ClinicalTrials.gov)
- I Drug Identification and Image Display (Pillbox)

### **Detailed Summary**

- Summary of reviewed biological and physical data (HSDB)
- References from scientific journals (Medline/PubMed)
- Full text biomedical articles (PubMed Central)
- References from toxicological journals (TOXLINE)
- Biological activities and chemical structures (PubChem)
- i Biological activities against HIV/AIDS and other viruses (NIAID ChemDB)
- Toxicological and chemical resources (ChemIDplus)

### Additional Resources

https://dailymed.nlm.nih.gov/dailyme

- DailyMed contains a compilation of medicines as submitted to the Food and Drug Administration (FDA).
- Trustworthy information about medications marketed in the United States.
- Standard and up-to-date look at current medication labels.
- Searchable for animal and human drugs.





ANIMAL DRUGS



MORE WAYS TO SEARCH:

ADVANCED SEARCH

**BROWSE DRUG CLASSES** 

LABEL ARCHIVES

TABLET/CAPSULE ID TOOL

This website contains 94572 drug listings as submitted to the Food and Drug Administration (FDA).

At the present time, this Web site does not contain a complete listing of labels for approved prescription drugs.







### NEWS

### **DailyMed Announcements**

Posted: October 3, 2016

### DailyMed/RxNorm Jamboree Workshop 2016 Archive

NLM's 4th annual Jamboree took place Tuesday, September 27, 2016, in the Lister Hill Auditorium at NLM on the NIH campus in Bethesda, MD. Please visit https://www.nlm.nih.gov/mesh/Jamboree/2016.html for an archived recording of the event, instructions on how to obtain presentation slides, and to provide feedback.

### MORE INFO

### Get RSS News & Updates



The DailyMed RSS feed provides updates and information about new drug labels approved by the FDA and published on NLM's DailyMed Web site.

### FDA GUIDANCES & INFORMATION

### **Drug Guidance, Compliance & Regulatory Information**



View FDA Structured Product Labeling Resources View All FDA Drug Guidances

### NLM SPL RESOURCES

The following Structured Product Labeling (SPL) resources have been created to assist industry professionals.

### **Download Data**



All Mapping Files

### SPL Image Guidelines



Guidelines for SPL image files of oral solid dosage forms that are submitted to the FDA with SPL documents.

**HUMAN DRUGS** 

FDA GUIDANCES & INFO | + NLM SPL RESOURCES | + APPLICATION DEVELOPMENT SUPPORT

ANIMAL DRUGS

MORE WAYS TO SEARCH

Enter drug, NDC code, drug class, or Set ID



DailyMed Example

- You can view the labels archived by the FDA
- Some drugs have photos to verify it is the right pill

 There are also links to other NLM resources

LABEL: TAMIFLU- oseltamivir phosphate capsule

TAMIFLU- oseltamivir phosphate powder, for suspension















VIEW DRUG PHOTOS

NDC Codes:

0004-0801-85







SAFETY

Report Adverse Events

FDA Safety Recalls

Presence in Breast Milk

RELATED RESOURCES

Medline Plus

NDC Code(s): 0004-0800-07, 0004-0800-08, 0004-0800-80, 0004-0800-85, view more

Packager: Genentech, Inc.

Category: HUMAN PRESCRIPTION DRUG LABEL

**DEA Schedule:** None

Marketing Status: New Drug Application

DRUG LABEL INFORMATION

Updated April 10, 2018

If you are a consumer or patient please visit this version



VIEW ALL SECTIONS

HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use TAMIFLU safely and effectively. See full prescribing information for TAMIFLU. TAMIFLU - ® (oseltamivir phosphate ...

FULL PRESCRIBING INFORMATION: CONTENTS\*

Table of Contents

1 INDICATIONS AND USAGE

1.1 Treatment of Influenza TAMIFLU is indicated for the treatment of acute, uncomplicated illness due to influenza A and B infection in patients 2 weeks of age and ...

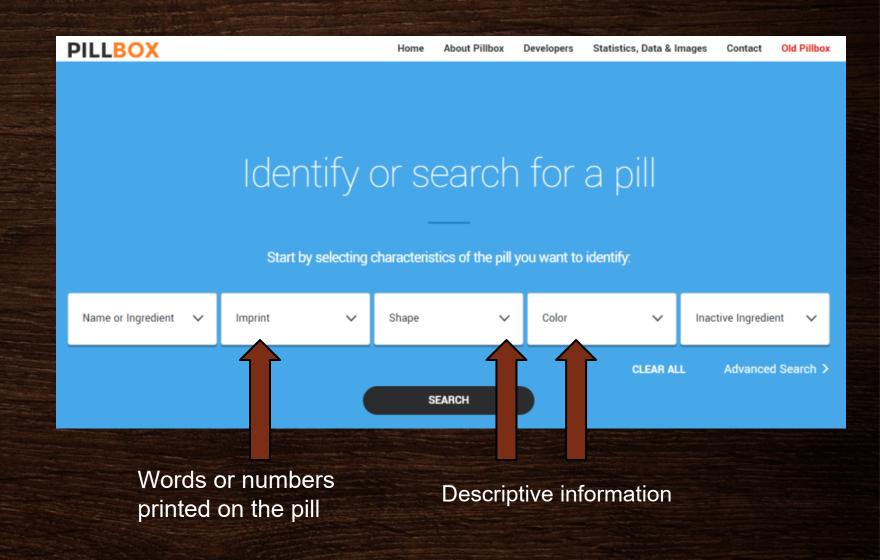
2 DOSAGE AND ADMINISTRATION

2.1 Dosage and Administration Overview - Administer TAMIFLU for the treatment of influenza in patients 2 weeks of age or older [see Dosage and Administration (2.2) ...

# Pillbox

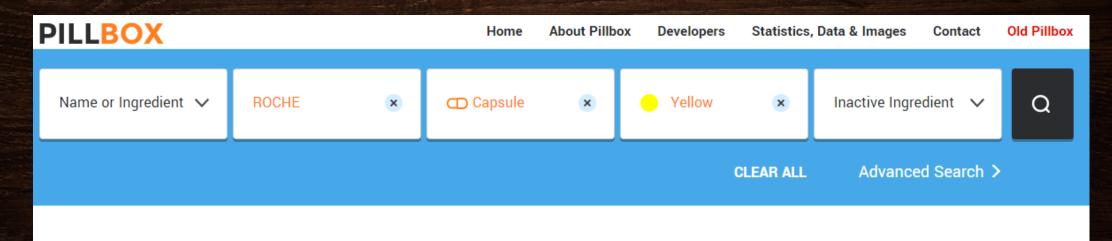
https://pillbox.nlm.nih.gov/pillimage/search.php

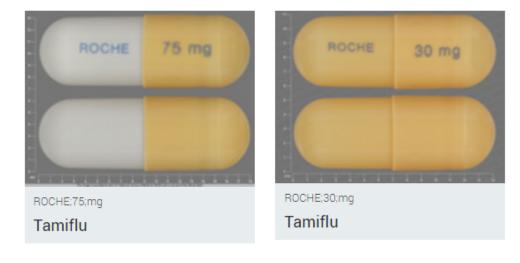
- Pillbox is a resource designed specifically to help in the rapid identification of unknown pills
- You can enter an imprint, shape, color and/or size to help identify a pill
- Look up drug names, ingredients, label authors, DEA schedules, or product codes



# Pillbox Results Example

Example features imprint, shape and color





# Other Drug and Supplements Resources

- MedlinePlus Drugs and Supplements: https://medlineplus.gov/druginformation.html
- <u>Drug Information Portal:</u>
   https://druginfo.nlm.nih.gov/drugportal/drugportal.jsp
- <u>DailyMed</u>: https://www.dailymed.nlm.nih.gov/
- Pillbox: https://pillbox.nlm.nih.gov/
- <u>Dietary Supplements Label Database</u>: https://www.dsld.nlm.nih.gov/dsld/
- <u>Drugs.com</u>: http://www.drugs.com
- TOXNET: <a href="https://toxnet.nlm.nih.gov/">https://toxnet.nlm.nih.gov/</a>

# Alternative and Complementary Medicine

# National Center for Complementary and Integrative Health (NCCIH)

### https://nccih.nih.gov/

- The NCCIH is the place to go for non-conventional medicine
- This site brings together conventional western medicine practices with complementary or alternative practices to form a complete picture of the health care environment

LU.S. Department of Health and Human Services

National Institutes of Health



Search NCCIH

Información en Español

NIH...Turning Discovery Into Health

Health Info

Research

Grants & Funding

Training

News & Events

About NCCIH

### Health

### All Health Topics from A-Z

Research-based info from acupuncture to zinc.

### Complementary, Alternative, or Integrative Health

What do these terms mean?

### Be Informed

Learn how to make wise health decisions.

### Herbs at a Glance

Uses and side effects of herbs and botanicals.

### How To Find a Practitioner

Information on seeking treatment,

### Information for Health Care Providers

Evidence-based medicine, continuing education, clinical practice guidelines, and more.

### Featured Health Topics

Parkinson's Disease (December 2016)



### Complementary Health Approaches for Military

Many military personnel, veterans, and their families turn to complementary and integrative health approaches in an effort to help manage pain and associated problems such as post-traumatic stress disorder.

# Health Info National Center for Complementary and Integrative Health NIH... Turning Discovery Into Health Health Info Research

Search NCCIH Q

Download the HerbList<sup>TM</sup>

App Store

Información en Español

Health Info Research Grants & Funding Training News & Events About NCCIH

### Herbs at a Glance

Share:









Herbs at a Glance is a series of brief fact sheets that provides basic information about specific herbs or botanicals—common names, what the science says, potential side effects and cautions, and resources for more information.



© Steven Foster

Google Play

app today.

### Subscribe

Get dietary supplement updates by e-mail

\*Email Address

Submit

Acai

Aloe Vera

Asian Ginseng

Astragalus

Bilberry

Bitter Orange

European Elder

European Mistletoe

Evening Primrose Oil

Fenugreek

Feverfew

Flaxseed and Flaxseed Oil

Licorice Root

Milk Thistle

Noni

Passionflower

Peppermint Oil

Pomegranate

 Also provides an easy to use app - HerbList

Info about

are in this

section

selected herbs

# Be an Informed Consumer

 Tips about what to look for to find good complementary health information and services

 Explore the science behind complementary health alternatives



NIH...Turning Discovery Into Health

Información en Español

Search NCCIH

Health Info Research Grants & Funding Training News & Events About NCCIH

### Be an Informed Consumer

Share:









Decisions about your health care are important—including decisions about whether or not to use complementary health products and practices. Take charge of your health by being an informed consumer. Find out and consider what scientific studies have been done on the safety and effectiveness of the product or practice that interests you. Discuss the information with your health care provider before making a decision. These fact sheets and resources can help you think about the issues to consider and questions to ask.



# Other Alternative and Complementary Health Resources

- NCCIH: National Center for Complementary and Integrative Health: https://nccih.nih.gov/
- MedlinePlus: Complementary and Integrative Medicine:

   https://medlineplus.gov/complementaryandintegrativemedicine.html
- HerbList: NIH mobile app on herbal products
- Mayo Clinic: https://www.mayoclinic.org/
- American Osteopathic Association:

   https://www.osteopathic.org/osteopathic-health/treatment/Pages/default.aspx
- American Music Therapy Association: https://www.musictherapy.org/faq/



# Genetics Home Reference

### https://ghr.nlm.nih.gov/

- Genetics Home Reference provides information about genetic conditions and the genes or chromosomes responsible
- Gene, chromosome, and condition summaries
- Illustrated handbook explaining the basics of how genes work and how mutations cause genetic disorders
- Glossary



Your Guide to Understanding Genetic Conditions

Search



Health Conditions

Genes

Chromosomes

Resource

Help Me Understand Genetics

Genetics Home Reference provides consumer-friendly information about the effects of genetic variation on human health.





### **Health Conditions**

More than 1,200 health conditions, diseases, and syndromes

Browse A-Z



### New & Updated Pages

### **New Pages**

Alopecia areata

Spastic paraplegia type 49

Lyme disease

More New Pages...

### **Updated Pages**

3-M syndrome

Cytochrome c oxidase deficiency

Feingold syndrome



### Genes

More than 1,400 genes and the



# Genetic Health Conditions

Find information on genetic diseases and conditions



### **Health Conditions**

Learn about the signs and symptoms, causes, and inheritance of more than 1,200 health conditions with a genetic basis.

Browse A-Z





Your Guide to Understanding Genetic Conditions

Search X Q

**Health Conditions** 

Genes

Chromosomes & mtDNA

Resources

Help Me Understand Genetics

### Parkinson disease

Printable PDF

Open All

Close All

### **▼** Description

Parkinson disease is a progressive disorder of the nervous system. The disorder affects several regions of the brain, especially an area called the <u>substantia nigra</u> that controls balance and movement.

Often the first symptom of Parkinson disease is trembling or shaking (tremor) of a limb, especially when the body is at rest. Typically, the tremor begins on one side of the body, usually in one hand. Tremors can also affect the arms, legs, feet, and face. Other characteristic symptoms of Parkinson disease include rigidity or stiffness of the limbs and torso, slow movement (bradykinesia) or an inability to move (akinesia), and impaired balance and coordination (postural instability). These symptoms worsen slowly over time.

Parkinson disease can also affect emotions and thinking ability (cognition). Some affected individuals develop psychiatric conditions such as depression and visual hallucinations. People with Parkinson disease also have an increased risk of developing dementia, which is a decline in intellectual functions including judgment and memory.

Generally, Parkinson disease that begins after age 50 is called late-onset disease. The condition is described as early-onset disease if signs and symptoms begin before age 50. Early-onset cases that begin before age 20 are sometimes referred to as juvenile-onset Parkinson disease.

### **Related Information**

What does it mean if a disorder seems to run in my family?

What is the prognosis of a genetic condition?

Genetic and Rare Diseases Information Center

## Genes

Search by genes



### Genes

Find information about the function of more than 1,400 genes and see how changes in these genes are related to health conditions.

Browse A-Z





Your Guide to Understanding Genetic Conditions

Search X Q

**Health Conditions** 

Genes

Chromosomes & mtDNA

Resources

Help Me Understand Genetics

### PARK7 gene

Parkinsonism associated deglycase

Printable PDF

Open All

Close All

#### **▼** Normal Function

The PARK7 gene provides instructions for making the DJ-1 protein. This protein is found in many tissues and organs, including the brain. Studies indicate that the DJ-1 protein has several functions, although none are fully understood. One of the protein's functions may be to help protect cells, particularly brain cells, from oxidative stress. Oxidative stress occurs when unstable molecules called free radicals accumulate to levels that can damage or kill cells. Additionally, the DJ-1 protein may serve as a chaperone molecule that helps fold newly produced proteins into the proper 3-dimensional shape and helps refold damaged proteins. Like other chaperone molecules, the DJ-1 protein may assist in delivering selected proteins to proteasomes, which are structures within cells that break down unneeded molecules. Researchers suggest that the DJ-1 protein may also play a role in activities that produce and process RNA, a chemical cousin of DNA.

#### **Related Information**

What is DNA?

What is a gene?

How do genes direct the production of proteins?

More about How Genes Work

- ▶ Health Conditions Related to Genetic Changes
- **▶** Chromosomal Location

## Chromosomes

 Find info on chromosomes and mitochondrial DNA



### **Chromosomes & mtDNA**

Read about each of the 23 pairs of human chromosomes and mitochondrial DNA (mtDNA).

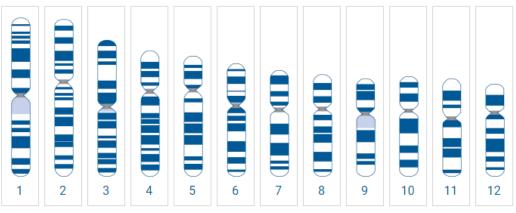
Browse

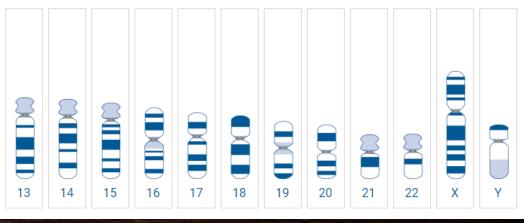


### Chromosomes & mtDNA

Read about each of the human chromosomes and mitochondrial DNA (mtDNA) and the health implications of genetic changes.

#### Information about specific chromosomes





Chromosomes

Example

GHR

**Health Conditions** 

Genes

Chromosomes & mtDNA

Resources

Help Me Understand Genetics

### Chromosome 21

Printable PDF

Open All

Close All

#### **▼** Description

Humans normally have 46 chromosomes in each cell, divided into 23 pairs. Two copies of chromosome 21, one copy inherited from each parent, form one of the pairs. Chromosome 21 is the smallest human chromosome, spanning about 48 million base pairs (the building blocks of DNA) and representing 1.5 to 2 percent of the total DNA in cells.

In 2000, researchers working on the Human Genome Project announced that they had determined the sequence of base pairs that make up this chromosome. Chromosome 21 was the second human chromosome to be fully sequenced.

Identifying genes on each chromosome is an active area of genetic research. Because researchers use different approaches to predict the number of genes on each chromosome, the estimated number of genes varies. Chromosome 21 likely contains 200 to 300 genes that provide instructions for making proteins. These proteins perform a variety of different roles in the body.

#### Related Information

What is DNA?

What is a chromosome?

How many chromosomes do people have?

- ▶ Health Conditions Related to Chromosomal Changes
- **▶** Chromosome Diagram
- ▶ Additional Information & Resources
- ▶ Sources for This Page

## Help Me Understand Genetics

- Provides definitions of key genetic concepts and explains the basics of genetics
- See examples of subjects on the right



### Help Me Understand Genetics

Explore topics in human genetics, from the basics of DNA to genomic research and personalized medicine.

Browse



- **▶ Cells and DNA**
- ▶ Mutations and Health
- **▶ How Genes Work**
- ▶ Gene Families
- ▶ Inheriting Genetic Conditions
- **▶** Genetics and Human Traits
- **▶** Genetic Consultation
- ▶ Genetic Testing
- **▶ Direct-to-Consumer Genetic Testing**
- ▶ Newborn Screening
- ▶ Gene Therapy
- ▶ The Human Genome Project
- ▶ Genomic Research
- **▶** Precision Medicine



Genetics

Example



**Health Conditions** 

Genes

Chromosomes & mtDNA

Resources

Help Me Understand Genetics

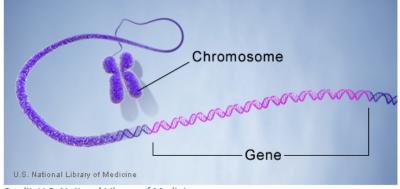
### What is a gene?

A gene is the basic physical and functional unit of heredity. Genes are made up of DNA. Some genes act as instructions to make molecules called proteins. However, many genes do not code for proteins. In humans, genes vary in size from a few hundred DNA bases to more than 2 million bases. The Human Genome Project estimated that humans have between 20,000 and 25,000 genes.

Every person has two copies of each gene, one inherited from each parent. Most genes are the same in all people, but a small number of genes (less than 1 percent of the total) are slightly different between people. Alleles are forms of the same gene with small differences in their sequence of DNA bases. These small differences contribute to each person's unique physical features.

Scientists keep track of genes by giving them unique names. Because gene names can be long, genes are also assigned symbols, which are short combinations of letters (and sometimes numbers) that represent an abbreviated version of the gene name. For example, a gene on chromosome 7 that has been associated with cystic fibrosis is called the cystic fibrosis transmembrane conductance regulator; its symbol is CFTR.

Genes are made up of DNA. Each chromosome contains many genes.



Credit: U.S. National Library of Medicine

#### For more information about genes:

Genetics Home Reference provides consumer-friendly gene summaries that include an explanation of each gene's normal function and how mutations in the gene cause particular genetic conditions.

More information about how genetic conditions and genes are named is also available from Genetics Home Reference.

The Centre for Genetics Education offers a fact sheet that introduces genes and chromosomes 2.

The Tech Museum of Innovation at Stanford University describes genes and how they were discovered .

The Virtual Genetics Education Centre. created by the University of Leicester, offers additional information on DNA. genes, and chromosomes .

# National Human Genome Research Institute

https://www.genome.gov/

The National Human Genome Research Institute (NHGRI) is a part of the National Institutes of Health (NIH). It contains research and information on obtaining funding for genome research.









Research Funding

#### **Highlights**



#### NHGRI contributes to study that implicates 63 new gene variants in prostate cancer risk

Elaine A. Ostrander, Ph.D., a researcher with the National Human Genome Research Institute, contributed to a new study that has implicated 63 additional genetic variants in prostate cancer risk. Dr. Ostrander and her colleagues based their findings, published in Nature Genetics, on DNA samples from more than 140,000 men.

#### The Cancer Genome Atlas: Charting the Course for Cancer Research

In the June issue of The Genomics Landscape, NHGRI Director Dr. Eric Green highlights the success of The Cancer Genome Atlas, as the program draws to an end. Other topics include the launch of the All of Us Research Program, the retirement of National Institute on Deafness and Other Communication Disorders Director Dr. James Battey to NHGRI Scientific Director Dr. Dan Kastner's selection as a finalist for the 2018 Samuel J. Heyman Service to America Medals.



#### New video reflects on successes of The Cancer Genome Atlas

After more than 10 years, The Cancer Genome Atlas (TCGA) has come to a close. A multi-institution collaboration initiated and supported by NHGRI and the National Cancer Institute (NCI), TCGA has been hugely successful in its mission to catalog the genomic changes underlying multiple cancer types. This video celebrates

#### **Email Updates**

Enter your email

#### **Genomics News**

From UT Southwestern Medical Center: Scientists unravel DNA code behind rare neurologic disease June 20, 2018

From the Eunice Kennedy Shriver National Institute of Child Health and Human Development: Release: New trans-NIH consortium aims to advance pediatric research on a global level

June 13, 2018

From Carnegie Mellon University: Team Develops Framework To Identify Genetic Missense Mutations Linked to Autism Spectrum Disorder June 11, 2018

View more

#### **Quick Links**







Strategic Planning

## Other Genetics Resources

- Definitions
  - Genetics Home Reference: <a href="http://ghr.nlm.nih.gov/glossary">http://ghr.nlm.nih.gov/glossary</a>
  - National Human Genome Research Institute: http://www.genome.gov/10002096
- GeneEd: <a href="https://geneed.nlm.nih.gov/">https://geneed.nlm.nih.gov/</a>
- Genetic Testing Registry: <a href="https://www.ncbi.nlm.nih.gov/gtr/">https://www.ncbi.nlm.nih.gov/gtr/</a>
- Genetic Disorders and Chromosomal Abnormalities: Other Resources <u>MedlinePlus: Genetic Disorders</u>
- CDC: Public Health Genomics
- University of Utah Health Sciences: Genetic Disorders

## **Evaluation of Health Websites**

### Resources

- Health on the Net Foundation (HON Codes): <a href="http://www.hon.ch/HONcode/Conduct.html">http://www.hon.ch/HONcode/Conduct.html</a>

### Aspects to Consider

- Accuracy
- Authority
- Bias
- Currency
- Coverage

## Accuracy

Is the information correct?

Do you see information on the site that you know isn't correct?

Does something seem like it might be incorrect?

When compared to a different site, does it have different information?



## Accuracy Bad Example

ThatCrystalSite.com
Incorrect information about
crystals affecting DNA

Energetically, cancer is stagnant or blocked energy. It often appears black to me, where there should be light or a colour. Putting light back in and opening the flow into the area is what needs doing. Doing the thing you really want to do, often comes to the forefront as the energy starts to flow into the area. DO IT!! You'll feel free and often just doing 'the thing' makes the world of difference – literally.

Healing stones I recommend are those that increase the energy flow, allowing more light to pass to the area. Stones that regenerate the cells, purify the mind / body, restructure DNA (so the dis-eased cells can go back to normal) create balance and stability by grounding the healing energy into the person's aura.



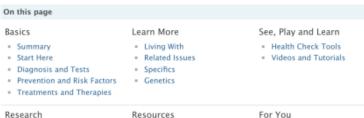
# Accuracy Good Example

### MedlinePlus.gov

 Correct information, which is repeated on other trusted sites Home → Health Topics → Cancer

#### Cancer

Also called: Carcinoma, Malignancy, Neoplasms, Tumor



- Statistics and Research
- Clinical Trials
- Journal Articles

#### Resources

- Reference Desk
- · Find an Expert
- = Men
- Women

= Children

- Seniors
- Patient Handouts

#### Summary

Cancer begins in your cells, which are the building blocks of your body. Normally, your body forms new cells as you need them, replacing old cells that die. Sometimes this process goes wrong. New cells grow even when you don't need them, and old cells don't die when they should. These extra cells can form a mass called a tumor. Tumors can be benign or malignant. Benign tumors aren't cancer while malignant ones are. Cells from malignant tumors can invade nearby tissues. They can also break away and spread to other parts of the body.

Cancer is not just one disease but many diseases. There are more than 100 different types of cancer. Most cancers are named for where they start. For example, lung cancer starts in the lung, and breast cancer starts in the breast. The spread of cancer from one part of the body to another is called metastasis. Symptoms and treatment depend on the cancer type and how advanced it is. Most treatment plans may include surgery, radiation and/or chemotherapy. Some may involve hormone therapy, immunotherapy or other types of biologic therapy, or stem cell transplantation.

NIH: National Cancer Institute













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#### MEDICAL ENCYCLOPEDIA

#### Cancer

Cancer and lymph nodes

Cancer prevention: take charge of your lifestyle

Cancer treatment -- early menopause

Cancer treatment: preventing infection

Cancer treatments

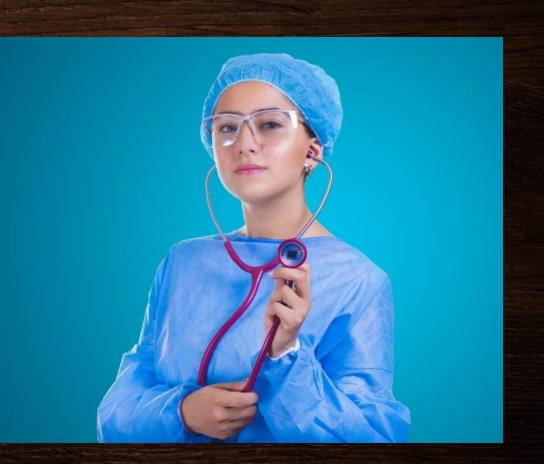
## Authority

Can you tell who wrote the info on the site?

Could you verify the credentials?

Is this person an expert on the health information in question?

Is this backed by a trusted organization?



# Authority Bad Example

### ThatCrystalSite.com

- Author not listed
- No credentials
- Not backed by any known or recognized organization
- No references



## Authority Good Example

### MedlinePlus.gov

- Author Dr. Laura J. Martin
- Credentials MD, MPH, ABIM Board Certified in Internal Medicine and Hospice and Palliative Medicine
- Backed by National Library of Medicine (NLM)
- References provided

#### References

Doroshow JH. Approach to the patient with cancer. In: Goldman L, Schafer AI, eds. Goldman-Cecil Medicine. 25th ed. Philadelphia, PA: Elsevier Saunders; 2016:chap 179.

National Cancer Institute website. Chemotherapy and you: support for people with cancer. www.cancer.gov/publications/patient-education/chemo-and-you. Updated June 2011. Accessed February 24, 2017.

National Cancer Institute website. Radiation therapy and you: support for people with cancer. www.cancer.gov/publications/patient-education/radiation-therapy-and-you. Updated October 2016. Accessed February 24, 2017.

Niederhuber JE, Armitage JO, Doroshow JH, Kastan MB, Tepper JE, eds. Abeloff's Clinical Oncology. 5th ed. Philadelphia, PA: Elsevier Saunders; 2014.

Siegel RL, Miller KD, Jemal A. Cancer statistics, 2016. CA Cancer J Clin. 2016;66(1):7–30. PMID: 26742998 www.ncbi.nlm.nih.gov/pubmed/26742998.

#### Review Date 2/13/2017

Updated by: Laura J. Martin, MD, MPH, ABIM Board Certified in Internal Medicine and Hospice and Palliative Medicine, Atlanta, GA. Also reviewed by David Zieve, MD, MHA, Medical Director, Brenda Conaway, Editorial Director, and the A.D.A.M. Editorial team.

## Bias

Is information leaning towards only one side?
Is only one treatment offered or discussed?

Is the site provided by a drug company or trying to sell only one drug?

Are there ads? This doesn't always mean untrustworthy, but if products are endorsed on the site, be aware.



# Bias Bad Example

### ThatCrystalSite.com

 Health information given is directly aimed at selling the crystals available for purchase from the website





ADD TO CART

0



AMEGREEN TUMBLED STONE

ADD TO CART

a



APATITE (BLUE) TUMBLED STONE

ADD TO CART

a

## Bias Good Example

### MedlinePlus.gov

- Information does not show favoritism
- All treatments are considered
- Not trying to sell anything
- Not endorsing anything

#### Cancer

Also called: Carcinoma, Malignancy, Neoplasms, Tumor

Basics	Learn More	See, Play and Learn
Summary Start Here Diagnosis and Tests Prevention and Risk Factors Treatments and Therapies	<ul><li>Living With</li><li>Related Issues</li><li>Specifics</li><li>Genetics</li></ul>	<ul><li>Health Check Tools</li><li>Videos and Tutorials</li></ul>
Research	Resources	For You
<ul> <li>Statistics and Research</li> </ul>	<ul> <li>Reference Desk</li> </ul>	<ul><li>Children</li></ul>
<ul> <li>Clinical Trials</li> </ul>	<ul> <li>Find an Expert</li> </ul>	<ul><li>Men</li></ul>
<ul> <li>Journal Articles</li> </ul>		<ul><li>Women</li></ul>
		<ul><li>Seniors</li></ul>

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NIH: National Cancer Institute

# Currency

How long ago was the info created or updated?

Is a date present?

Does the info look recent?



## Currency Bad Example

### ThatCrystalSite.com

 The worst example would have no date anywhere

 This posting has an older date and no sign of having been reviewed since



## Currency Good Example

### MedlinePlus.gov

 Recent Review Date: 2/13/2017 along with reviewe names

All content is regularly reviewed on MedlinePlus

#### References

Doroshow JH. Approach to the patient with cancer. In: Goldman L, Schafer AI, eds. *Goldman-Cecil Medicine*. 25th ed. Philadelphia, PA: Elsevier Saunders; 2016:chap 179.

National Cancer Institute website. Chemotherapy and you: support for people with cancer. www.cancer.gov/publications/patient-education/chemo-and-you. Updated June 2011. Accessed February 24, 2017.

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# Coverage

Is the information comprehensive?

Does the site include information like side effects, costs, or other negative points as well as positive points?



# Coverage Bad Example

### ThatCrystalSite.com

- No information about costs compared to other treatments
- No potential downsides
- No alternatives given





ADD TO CART



AMEGREEN TUMBLED STON

ADD TO CART



APATITE (BLUE) TUMBLED STONE

ADD TO CART

## Coverage Good Example

### MedlinePlus.gov

 Alternative therapies and medications are mentioned throughout the page

 All side effects and potential problems are given for medications and therapies.

#### SIDE EFFECTS OF CHEMOTHERAPY

Because these medicines travel through the blood to the entire body, chemotherapy is described as a bodywide treatment.

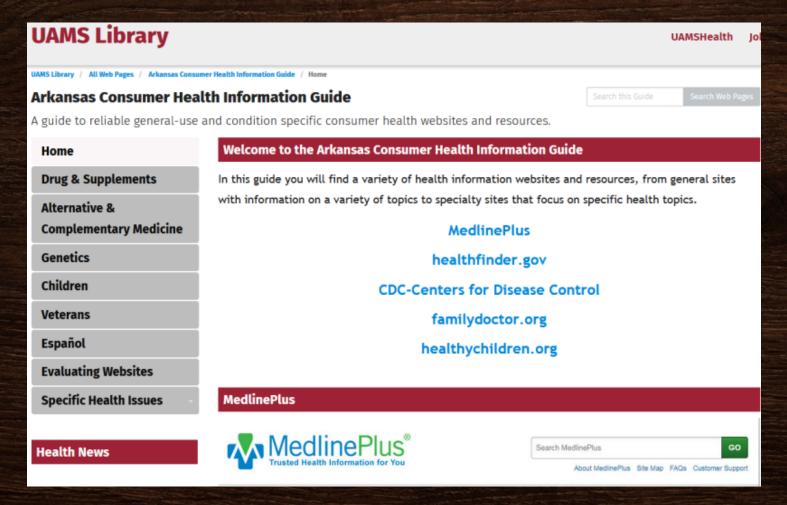
As a result, chemotherapy may damage or kill some normal cells. These include bone marrow cells, hair follicles, and cells in the lining of the mouth and the digestive tract.

When this damage occurs, there can be side effects. Some people who receive chemotherapy:

- · Are more likely to have infections
- · Become tired more easily
- · Bleed too much, even during everyday activities
- · Feel pain or numbness from nerve damage
- · Have a dry mouth, mouth sores, or swelling in the mouth
- · Have a poor appetite or lose weight
- · Have an upset stomach, vomiting, or diarrhea
- · Lose their hair
- · Have problems with thinking and memory ("chemo brain")

Side effects of chemotherapy depend on many things, including the type of cancer and which drugs are being used. Each person reacts differently to these drugs. Some newer chemotherapy drugs that better target cancer cells may cause fewer or different side effects.

## Arkansas Consumer Health Information Guide



This is the <u>website</u> created specifically to help navigate through using and evaluating consumer health websites. It contains all the resources discussed in this class.

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