



CBD2: a functional biomarker database for colorectal cancer

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Introduction

CBD: Colorectal Cancer Biomarker Database

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Introduction to colorectal cancer

Cancer that begins in the colon is called colon cancer, and cancer that begins in the rectum is called rectal cancer. Cancer that starts in either of these organs may also be called colorectal cancer.

The digestive system is made up of the esophagus, stomach, and the small and large intestines. The first 6 feet of the large intestine are called the large bowel or colon. The last 6 inches are the rectum and the anal canal.

Estimated New Cases in 2017	135,430
% of All New Cancer Cases	8.0%
Estimated Deaths in 2017	50,260
% of All Cancer Deaths	8.4%

100 New Cases
100 Deaths

Percent Surviving 5 Years: 64.9% (2007-2013)

News

- Oct, 2017— 36891 samples were included in CBD
- Oct, 2017— 870 biomarkers were included in CBD
- Oct, 2017— 1124 records were included in CBD
- Nov, 2017— Statistics results were included in CBD
- Nov, 2017— Bioinformatics results were included in CBD

Links

—From SHEER(<https://www.cancer.gov/statfacts/html/colorect.htm>)

Database (Oxford)

<http://www.sysbio.org.cn/cbd>



CBD2: Colorectal Cancer Biomarker Database

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Data in CBD2

2391 (+1276) Articles 1866 - Dec 2022	2439 (+1569) Biomarkers 150 Non-biomarkers Newly Biomarkers	520 Known Targets 4883 Drugs Drug-Target Data
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About Colorectal Cancer

The digestive system is made up of the esophagus, stomach, and the small and large intestines. The first 6 feet of the large intestine are called the large bowel or colon. The last 6 inches are the rectum and the anal canal. Cancer that begins in the colon is called colon cancer, and cancer that begins in the rectum is called rectal cancer. Cancer that starts in either of these organs may also be called colorectal cancer.

Estimated New Cases in 2023	153,020
% of All New Cancer Cases	7.8%
Estimated Deaths in 2023	52,550
% of All Cancer Deaths	8.4%

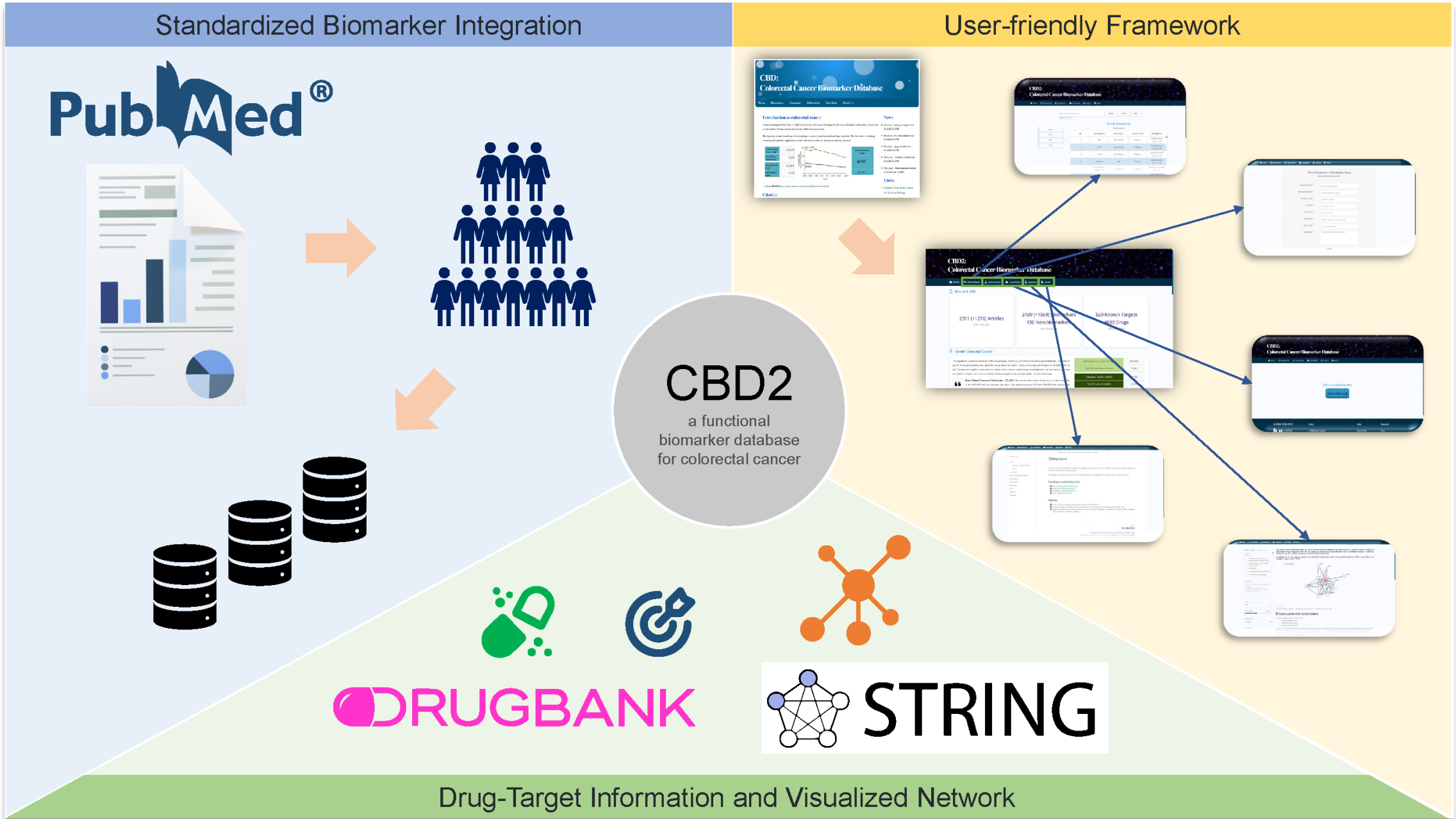
Rate of New Cases and Deaths per 100,000: The rate of new cases of colorectal cancer was 36.4 per 100,000 men and women per year. The death rate was 13.1 per 100,000 men and women per year.

<http://www.eyeseeworld/cbd/>

In order to provide researchers with a comprehensive platform to search for accurate and categoric information for Colorectal Cancer (CRC) biomarkers, we published the colorectal cancer biomarker database (CBD) in 2018, which gathered the curated data for all the reported 870 biomarkers for CRC.

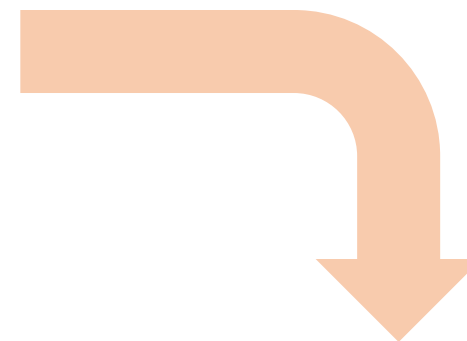
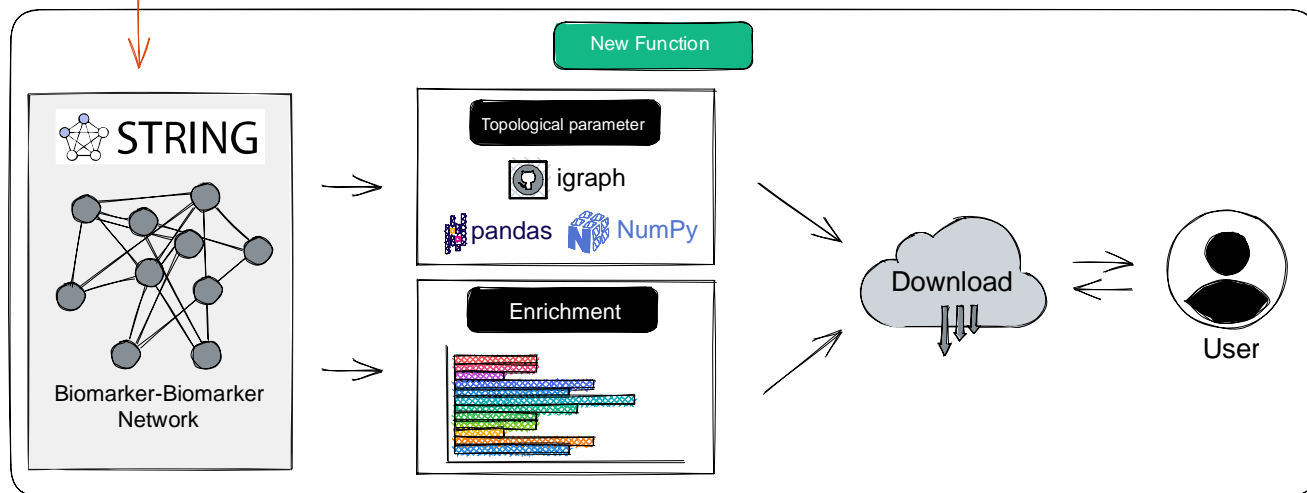
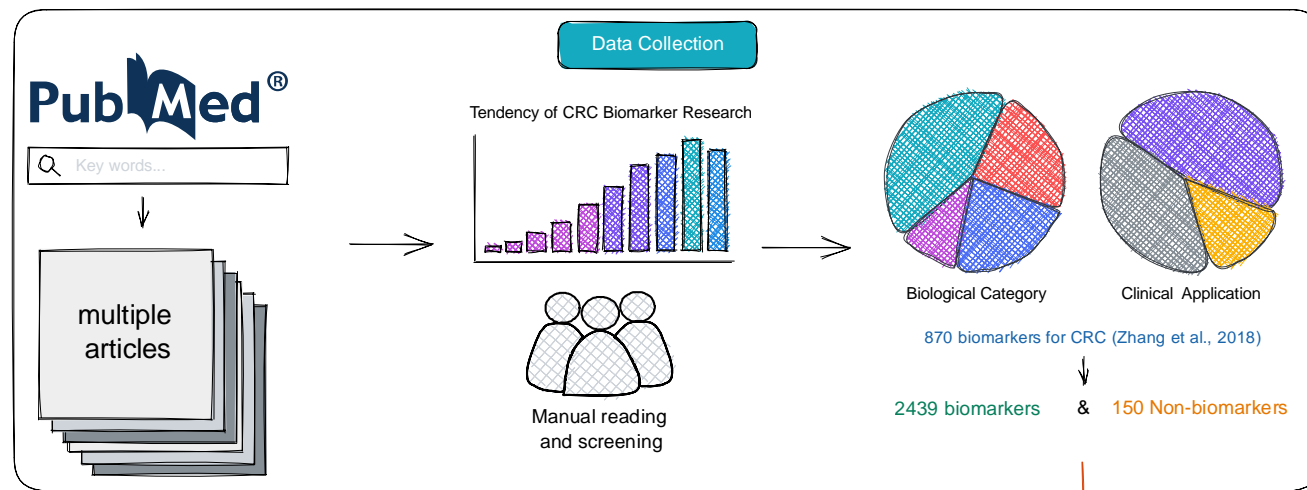
In this study, we present the CBD2 database (<http://www.eyeseeworld.com/cbd/>), including a substantial number of newly discovered biomarkers, as well as non-biomarkers, and incorporates network visualization and topology analysis functions.

Highlights





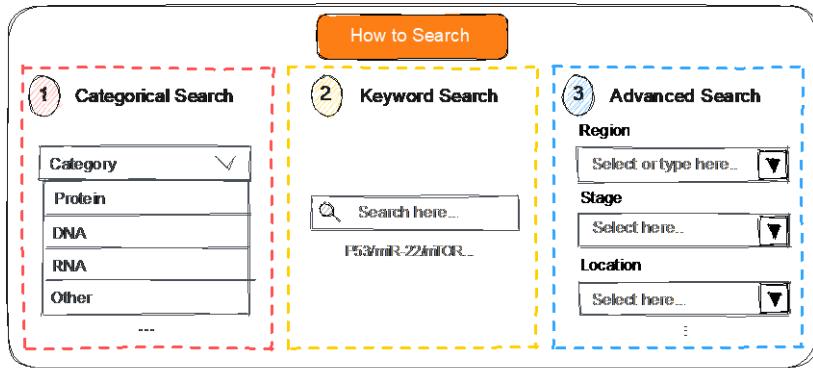
Pipeline



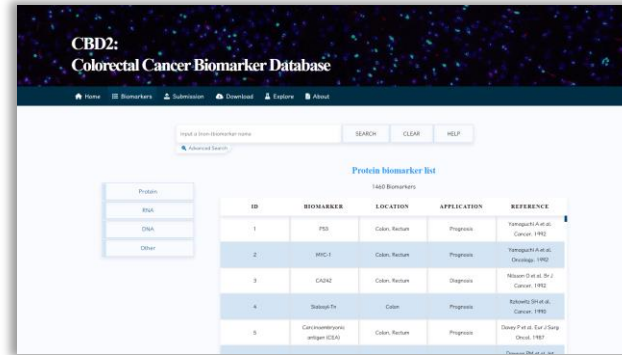
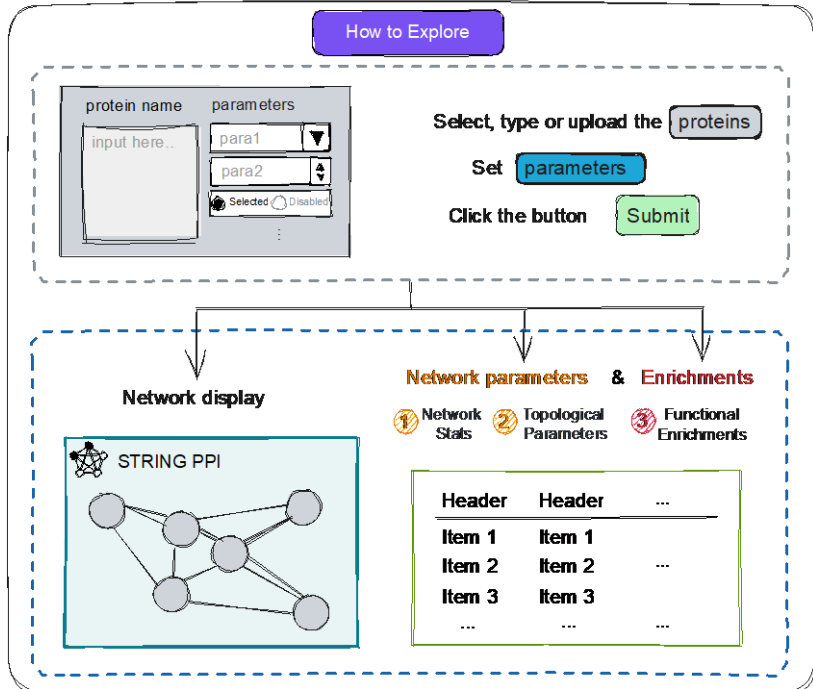
	CBD	CBD2
Year Range	1986 ~ 2017	2018 ~ Dec 2022
Number of Articles	1115	2391(+1276)
Number of Biomarkers	870	2439(+1569)
Number of Non-biomarkers	\	150
STRING Network	\	1271
Drug-Target Data	\	520 Known Targets 4883 Drugs

Usage

(A)

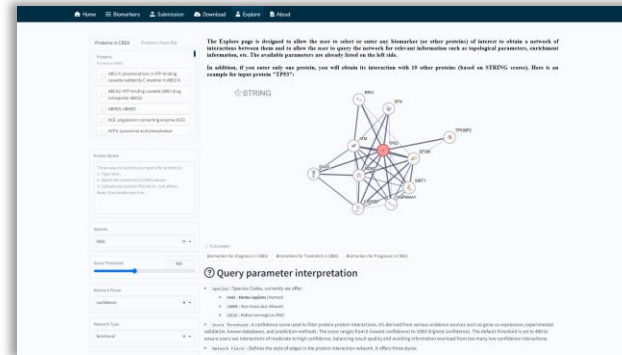


(B)



(A) Three different ways offered by us to retrieve data:

1. Categorical Search
2. Keyword Search
3. Advanced Search

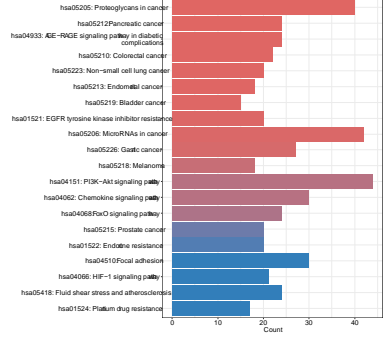
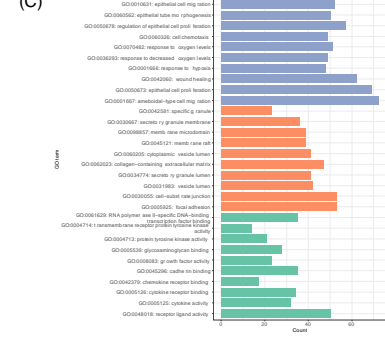
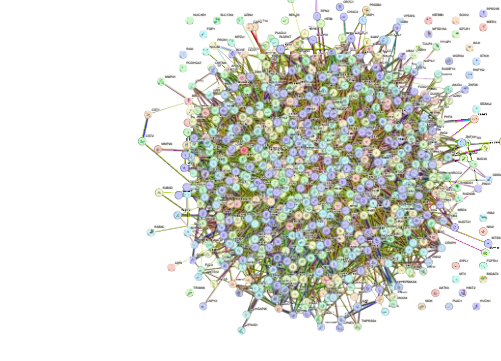
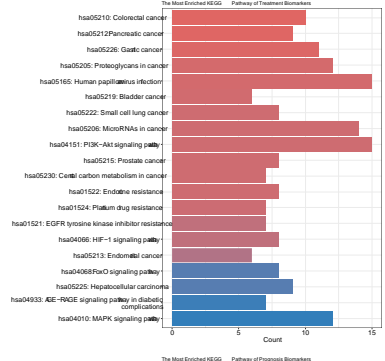
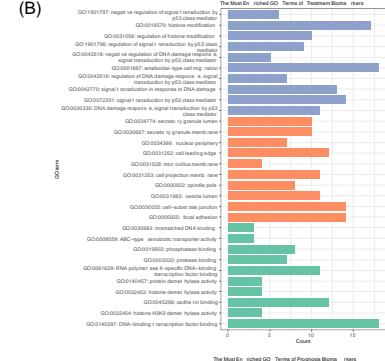
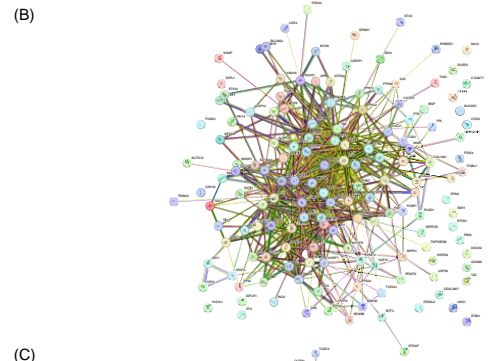
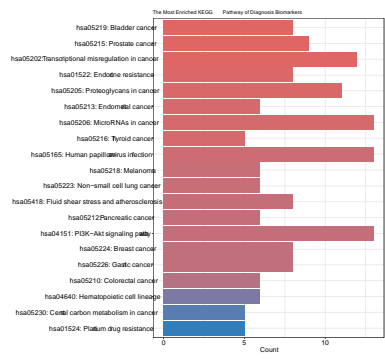
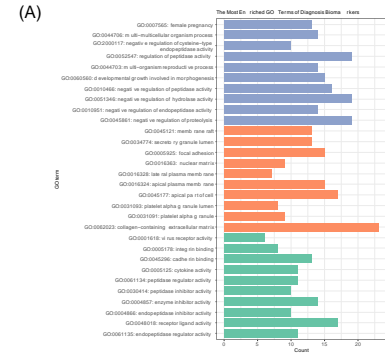
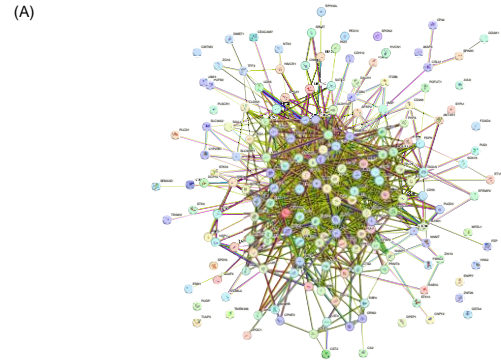


(B) Steps and schematic diagram of the network analysis function module.



Case Study and Results

Case Study 1: Integrated Network Analysis of Biomarkers in CBD2



(A) Diagnosis

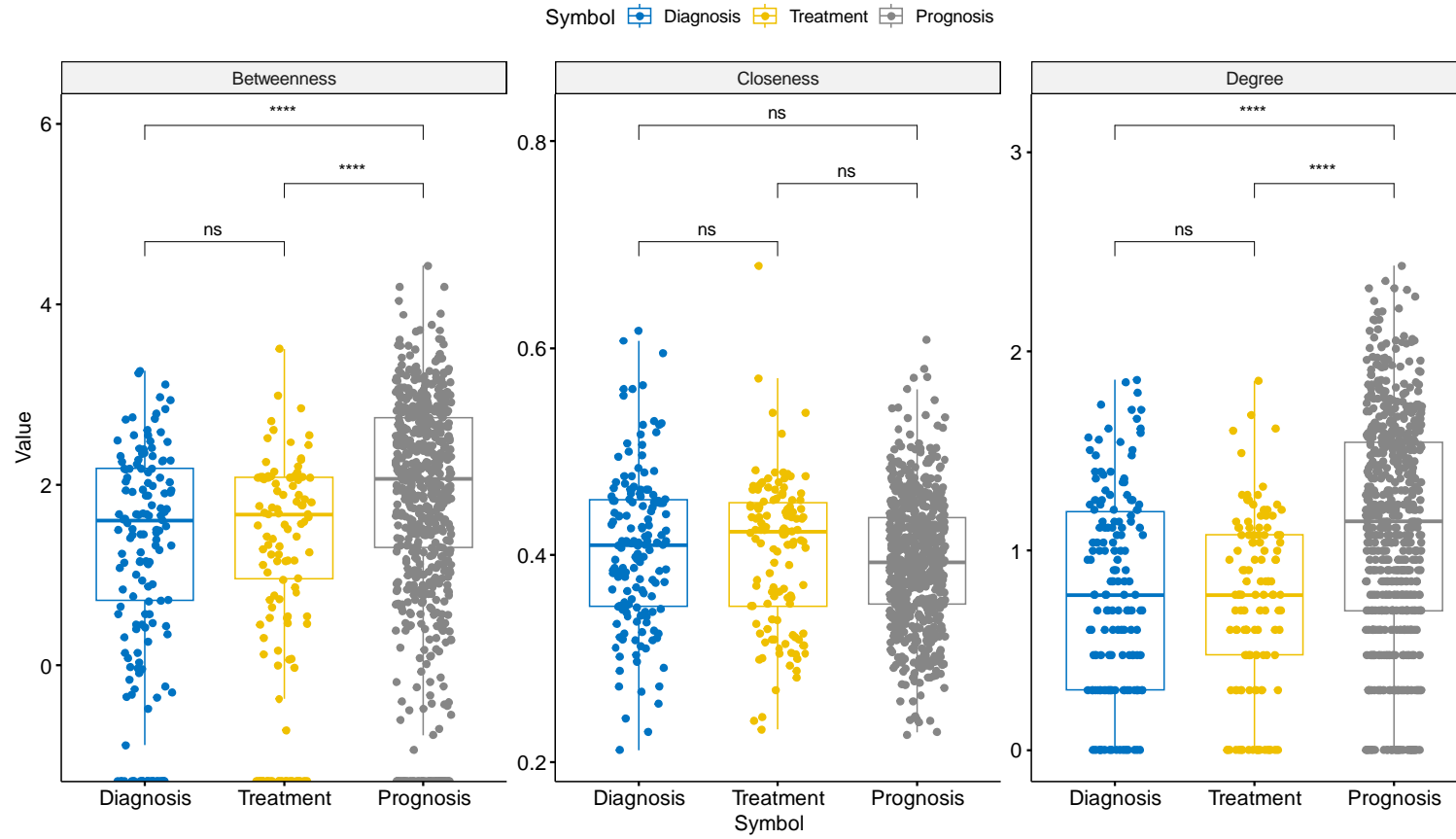
(B) Treatment

(C) Prognosis



Case Study and Results

Case Study 1: Integrated Network Analysis of Biomarkers in CBD2





Case Study and Results

Case Study 2: Comparison of the Same Biomarker in Different Studies

Table 2: The research contents of 6 literatures for *p53*.

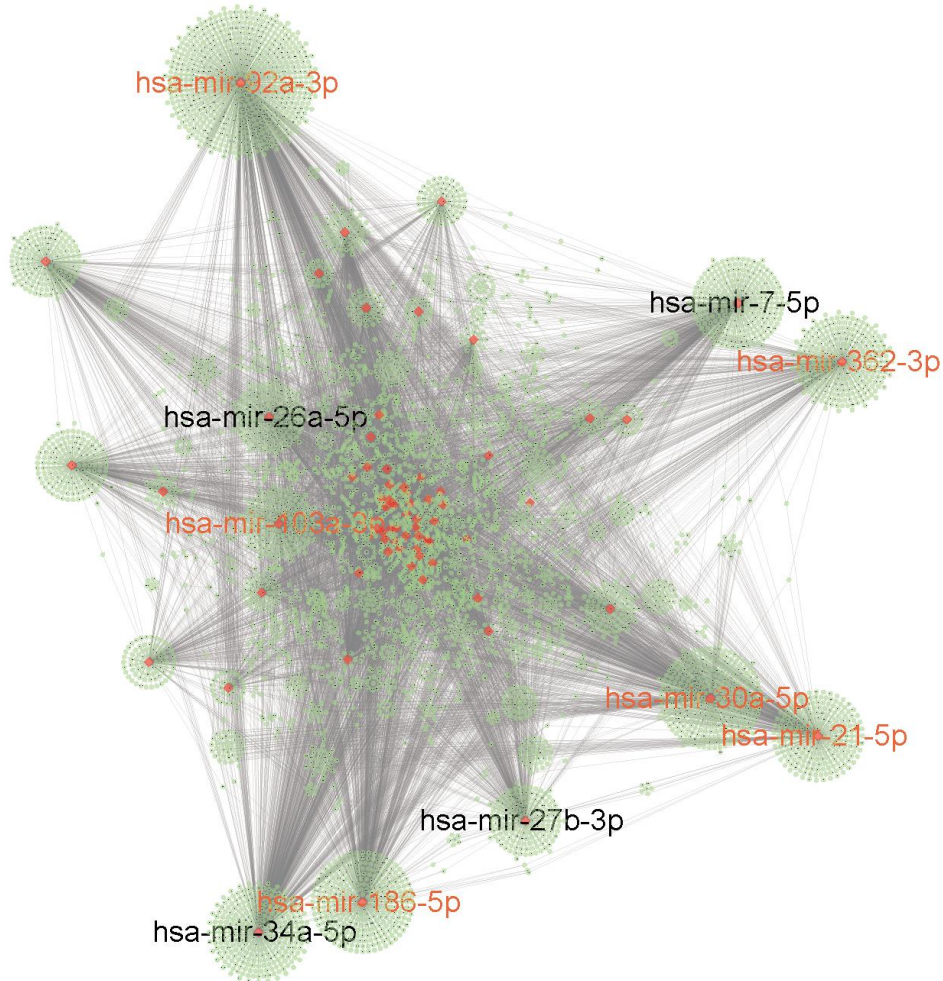
p53		Patients Number		Recurrence Rate		Median Survival (months)		2 Year Survival Rate		3 Year Survival Rate		5 Year Survival Rate	
ID	PMID	p53-positive	p53-negative	p53-positive	p53-negative	p53-positive	p53-negative	p53-positive	p53-negative	p53-positive	p53-negative	p53-positive	p53-negative
1	1451055	39	61	23.8	5.9	\	\	\	\	61.8	96.7	\	\
19	7931472	50	57	60	35	\	\	\	\	\	\	48	78.9
31	8347496	121	82	Higher	Lower	\	\	\	\	\	\	58.1	76.3
42	8874329	72%	28%	\	\	21	53.2	41.7	78.6	\	\	\	\
78	9797697	44	25	\	\	27	93	\	\	31.5	71.8	21	53.1
202	12818291	38	37	\	\	\	\	\	\	\	\	63.2	86.5



Case Study and Results

Case Study 3: ncRNA-gene Interaction Network

(A)



(B)

Name	Degree	Betweenness	Closeness	Type
hsa-mir-92a-3p	1461	0.288450102	0.395335716	miRNA_CBD
hsa-mir-34a-5p	968	0.159975197	0.37267301	miRNA
hsa-mir-30a-5p	820	0.142447543	0.366138303	miRNA_CBD
hsa-mir-186-5p	819	0.140474726	0.36592584	miRNA_CBD
hsa-mir-7-5p	760	0.122041271	0.363772714	miRNA
hsa-mir-21-5p	686	0.109831692	0.360404641	miRNA_CBD
hsa-mir-103a-3p	664	0.091723654	0.359541593	miRNA_CBD
hsa-mir-26a-5p	621	0.086493933	0.357827839	miRNA
hsa-mir-362-3p	566	0.103204483	0.355327661	miRNA_CBD
hsa-mir-27b-3p	526	0.076528336	0.354011115	miRNA

In the ncRNA-gene interaction network, we found **7 of the hubs** are included in CBD2.



Summary

- ❑ In this study, we have updated the CRC biomarker database (CBD2), which have included 2439 reported biomarkers for CRC.
- ❑ We have added drug-target information and Biomarker-Biomarker interaction (BBI) network analysis function in this update.
- ❑ We have provided a user-friendly interface, and we anticipate that the updated version of CBD2 will serve as a flexible and valuable tool for advancing CRC biomarker research.

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