Review

Analysis and insights into the changes of traditional Chinese medicine review and approval from 2020 to 2024

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Abstract

The official release of the "Drug Registration Management Measures" in January 2020 marked a new milestone in the classification management of traditional Chinese medicine (TCM) registration, ushering in a new era for the registration and application of innovative TCM drugs. This article provides a detailed analysis of the approval status of innovative TCM drugs, improved new drugs, and ancient classic prescription compound preparations from 2020 to 2024, revealing the significant achievements made in the inheritance and innovation of TCM in China. The study found that the number of New Drug Applications (NDAs) and Investigational New Drug Applications (INDs) have increased annually, with a particularly notable surge in the submission of applications for classic prescription compound preparations. The approval rates for innovative TCM drugs and improved new drugs have significantly increased, along with the streamlining of review and approval process, leading to shorter development cycles and reduced costs. Key findings include: (1) Enterprises demonstrate strong enthusiasm for the research and development of innovative and improved TCM drugs, actively engaging in various types of drug R&D and submissions; (2) Classic prescription compound preparations have become a focal point for enterprises due to their shorter development cycles and lower costs; (3) Improvement to the "three-combined" evidence system has accelerated the R&D process by incorporating real-world data. Through this study, we aim to provide valuable insights for TCM R&D enterprises and policymakers, promoting the sustained prosperity and development of the TCM sector.

Keywords: Traditional Chinese medicine (TCM); innovative drugs; review; approval; new drug application; clinical trial application; traditional classic prescription

Traditional Chinese medicine (TCM), as a unique health resource in China, is an important source of scientific and technological innovation as well as an important part of cultural heritage. In the new era, the state attaches great importance to the development of the TCM industry and regards the inheritance and innovation of TCM as a national strategy.

On December 25, 2016, the 25th meeting of the 12th National People's Congress Standing Committee passed the "traditional Chinese medicine Law of the People's Republic of China" [1]. The implementation of this law officially provides legal guarantee for inheriting and promoting TCM, safeguarding and promoting the development of

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TCM, and protecting people's health. In 2017, the General Office of the CPC Central Committee and the General Office of the State Council issued the "Opinions on Deepening the Reform of the Review and Approval System to Encourage the Innovation of Drugs and Medical Devices" [2], which calls for the establishment and improvement of a registration management system and technical evaluation system that conforms to the characteristics of TCM. These guiding opinions officially initiate the reform of TCM registration approval.

In October 2019, the CPC Central Committee and the State Council issued the "Opinions on Promoting the Inheritance, Innovation and Development of traditional Chinese medicine" [3], establishing a clear policy framework for TCM development. In January 2020, the "Drug Registration Administration Method" [4] was officially released, a milestone in the change of TCM registration classification management. This regulatory evolution not only reforms the registration classification but also optimizes the review and approval process. With the formal release of the "Special Provisions for the Registration Management of traditional Chinese medicine" [5] in 2023, the regulatory law system for TCM has been further improved, the quality control of TCM production has been enhanced, and the innovation of compound preparations of TCM has been further encouraged. These measures have provided robust legal and policy foundations for the heritage preservation and innovative development of China's TCM industry.

1 Data sources and processing methods

1.1 Data sources

This article uses data from the drug database of the National Medical Products Administration (NMPA), the website of the Center for Drug Evaluation (CDE), and the insight database.

1.2 Data classification and standards

The data of innovative TCM refers to the data of new drugs in Category 5 and Category 6 in the 2007 registration classification [6] as well as the data of new drugs in Category 1 in the 2020 registration classification [7]. Among them, Category 5 in the 2007 registration classification refers to the effective parts and their preparations extracted from substances such as plants, animals, minerals, etc., that have not been marketed and sold in China; Category 6 refers to traditional Chinese medicine and natural medicine compound preparations that have not been marketed and sold in China. The new drugs in Category 1 of the 2020 registration classification include new TCM compound preparations (Category 1.1), extracts and their preparations obtained from a single substance such as plants, animals, minerals, etc. (Category 1.2), and new medicinal materials and their preparations (Category 1.3).

According to the 2020 registration classification, the data of improved new mainly include improved new drugs with changed administration routes (Category 2.1), improved new drugs with changed dosage forms (Category 2.2), improved new drugs with increased functions and indications (Category 2.3), and improved new drugs with obvious changes in the medicinal material base or drug absorption and utilization caused by changes in production processes or excipients (Category 2.4).

According to the 2020 registration classification, the compound preparations of ancient classic famous prescriptions include the compound preparations of traditional Chinese medicine managed according to the catalogue of ancient classic famous prescriptions (Category 3.1) and other compound preparations of traditional Chinese medicine derived from ancient classic famous prescriptions (Category 3.2). This includes the compound preparations of ancient classic famous prescriptions not managed according to the catalogue of ancient classic famous

prescriptions and the compound preparations of traditional Chinese medicine based on addition and subtraction of ancient classic famous prescriptions.

In addition, drugs with the same name and formula are excluded from new TCM drug statistics.

1.3 Data scope and processing principles

Data analysis followed these principles: (1) Data are CDE-accepted and NMPA-approved from January 1, 2020 to December 31, 2024; (2) Imported TCM preparations and API applications (Categories 1.2 and 1.3) are not included; (3) Multiple specifications at the same time and with the same indications are counted as one variety.

1.4 Data processing

Data were processed using Microsoft Excel 2016.

2 Results

2.1 General information of TCM new drug applications

2.1.1 Number of applications

From 2020 to 2024, a total of 342 TCM new drug applications were recorded, among which the number of NDA (new drug application) was 91 and the number of IND (investigational new drug application) was 251. Both application types demonstrated overall growth trend (Fig. 1). The notable increase in NDAs is primarily attributed to the significant growth in the application data of classic famous prescription compound preparations. If NDAs of classic famous prescription compound preparations were not included, the annual average application count was 8.

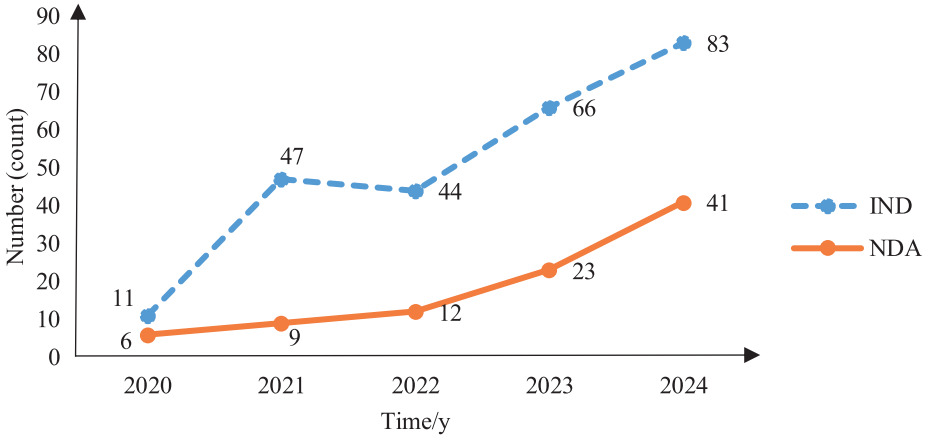

Fig. 1 Number of applications for new TCM drugs from 2020 to 2024

2.1.2 Registration classification

IND applications primarily contain Category 1.1 innovative drugs (64.5%), followed by Category 2.3 improved new drugs (19.9%). Among NDA applications, Category 3.1 classic famous prescription compound preparations ranks the first (48.4%), followed by Category 1.1 innovative drugs (37.4%), as shown in Table 1. These data indicate that the clinical trial applications for new TCM drugs in China focus primarily on brand-new TCM compound preparations and improved new

drugs for marketed products with added functions and indications. In addition, with the concentrated outbreak of classic famous prescription compound preparation marketing applications in the past two years, the number of NDA has reached 50, exceeding the number of NDA for Category 1 innovative drugs.

Table 1 Percentage of applications for different registration categories of new TCM drugs from 2020 to 2024/%

Registration classification	IND	NDA	In total
1.1	162 (64.54)	34 (37.36)	196
1.2	24 (9.56)	4 (4.40)	28
1.3	4 (1.59)	0	4
2.1	3 (1.20)	2 (2.20)	5
2.2	7 (2.79)	1 (1.10)	8
2.3	50 (19.92)	0	50
2.4	1 (0.4)	0	1
3.1	0	44 (48.35)	44
3.2	0	6 (6.59)	6
In total	251 (100.00)	91 (100.00)	

Note: 1. The number of Class 1.1 NDAs includes 1 original Class 6; 2. The number of Class 2.3 INDs includes 2 applications that are both Class 2.2 and Class 2.3.

2.1.3 Dosage form analysis

Both NDA and IND applications are mainly in the form of granules, followed by capsules and tablets (Table 2). In IND applications, in addition to the above-mentioned TCM dosage forms, some dosage forms that conform to the characteristics of TCM diagnosis and treatment have emerged, such as ointments, powders, medicinal liquors, etc. Some modern drug dosage forms have also appeared, such as gels, inhalers, etc. Though representingsmall quantities, these forms reflect the inheritance and development of TCM.

Table 2 Dosage forms of new TCM applications from 2020 to 2024

NDA		IND			
Dosage form	Quantity	Dosage form	Quantity	Dosage form	Quantity
Granules	60	Granules	116	Gels	3
Capsules	11	Capsules	43	Patches	3
Tablets	9	Tablets	32	Injections	3
Patches	4	Oral Liquid	13	Teas	2
Oral Liquid	3	Ointments	6	Mixtures	2
Pills	2	Suppository	6	Lotions	1
Injections	1	Pills	6	Liniments	1
Dropping Pills	1	Dropping Pills	4	Powders	1
Total	91	Balms	4	Medicinal iquors	1
		Inhalants	4	Total	251

2.1.4 Provinces for application enterprises

The top five provinces and cities for IND applications are Jiangsu, Guangdong, Beijing, Shandong and Zhejiang, and the top five provinces and cities for NDA applications are Guangdong, Jiangsu, Hebei, Hubei and Shandong (Table 3). This distribution reflects China's concentrated TCM research and development activities in economically developed eastern and southern coastal areas.

Table 3 Provinces for the application enterprises from 2020 to 2024

Province	IND	NDA	Province	IND	NDA
Guangdong	38	14	Xinjiang	12	2
Jiangsu	40	13	Jiangxi	6	2
Hebei	10	12	Hainan	3	2
Hubei	8	7	Fujian	3	1
Shandong	14	5	Henan	1	1
Zhejiang	12	4	Guangxi	7	0
Shanghai	11	4	Yunnan	5	0
Hunan	8	4	Heilongjiang	3	0
Anhui	2	4	Liaoning	3	0
Jilin	2	4	Shanxi	3	0
Beijing	33	3	Inner Mongolia	1	0
Tianjin	12	3	Tibet	1	0
Sichuan	11	3	Chongqing	1	0
Guizhou	1	3	total	251	91

2.2 Approval and marketing situation of innovative TCM drugs from 2020 to 2024

During this period, there are 24 innovative TCM drugs approved for marketing (Fig. 2). According to the registration classification approved by the 2007 edition, there were a total of 7 products, among which there were 2 products of Class 5 (Total Alkaloids of Ramulus Mori Tablets and Total Flavonoids of Abelmoschus Manihot Flower Buccal Plaster), and 5 products of Class 6 (Yishen Yangxin Anshen Tablets, Yiqi Tongqiao Pills, Lianhua Qingke Tablets, Jingu Zhitong Gel, and Qijiao Tiaojing Granules).

According to the registration classification approved by the 2020 edition, a total of 17 products were approved for marketing, among which there were 14 Class 1.1 products (Yinqiao Qingre Tablets, Xuanqi Jiangu Tablets, Qizhi Yishen Capsules, Kunxinning Granules, Huzhen Qingfeng Capsules, Jieyu Chufan Capsules, Qirui Weishu Capsules, Shenge Bushen Capsules, Shenyu Ningshen Tablets, Xiao'er Zibei Xuanfei Syrup, Tongluo Mingmu Capsules, Ercha Shangqing Pills, Jiuwei Zhike Oral Liquid, and Qinwei Granules), and 3 Class 1.2 products (Icaritin Soft Capsules, Total Flavonoids of Desmodium Pulchellum Capsules, and Immature Bitter Orange Total Flavonoids Tablets).

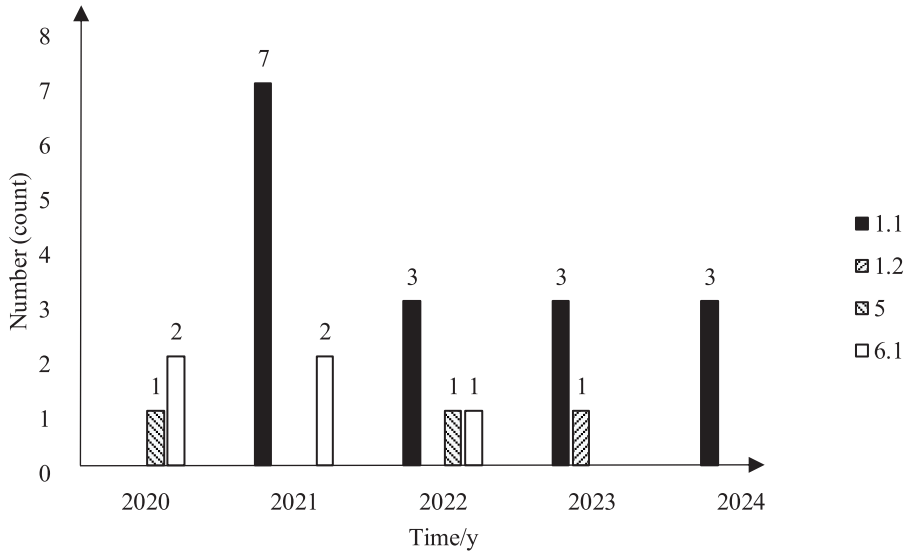

Fig. 2 Number of approved and listed innovative TCM from 2020 to 2024

As shown in Fig. 3, products used in the orthopedic field ranked the highest in the therapeutic areas for the 24 products, with a total of 4 products approved. They are Jingu Zhitong Gel (6.1) for the treatment of knee osteoarthritis, Xuanqi Jiangu Tablets (1.1) for the treatment of mild to moderate knee osteoarthritis, Huzhen Qingfeng Capsules (1.1) for the treatment of mild to moderate acute gouty arthritis, and Qinwei Granules (1.1) for the treatment of acute gouty arthritis. There are 3 products in the respiratory system field, namely Lianhua Qingke Tablets (6.1) for the treatment of acute tracheo-bronchitis, Yinqiao Qingre Tablets (1.1) for the treatment of wind-heat type common cold, and Jiuwei Zhike Oral Liquid (1.1) for the treatment of acute tracheo-bronchitis. There are 3 products in the field of mental disorders, namely Jieyu Chufan Capsules (1.1), Shenyu Ningshen Tablets (1.1), and Shenge Bushen Capsules (1.1), all of which are used for the treatment of mild and moderate depression.

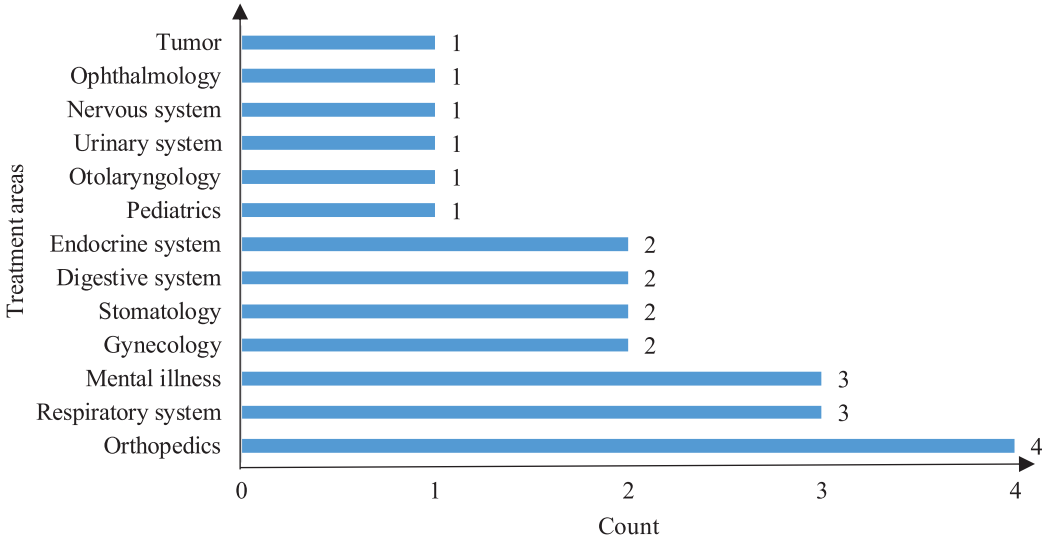

Fig. 3 Treatment areas of the approved and listed innovative TCM from 2020 to 2024

2.3 Analysis of the review and approval of applications for innovative TCM

2.3.1 Application situation of innovative TCM drugs for marketing

During the period from 2020 to 2024, there were a total of 38 varieties of NDA applications (Fig. 4). According to the review status analysis, a total of 19 varieties were approved, 6 varieties failed to be approved, and there are 13 applications still under review. From the perspective of registration classification, there are 33 Class 1.1 products, 4 Class 1.2 products, and 1 product registered according to the 2007 edition.

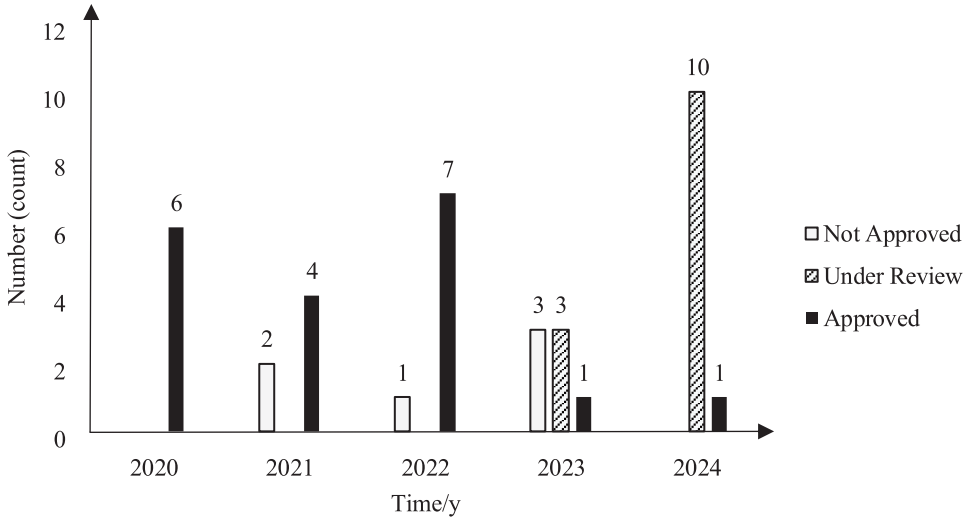

Fig. 4 Number of NDA acceptances for innovative TCM from 2020 to 2024

13 products under review and approval are distributed in 9 therapeutic areas (Table 4). Among them, there are 3 products in the nervous system field, namely Hydroxysafflor Yellow A Injection (Class 1.2) for the treatment of acute ischemic stroke, Tongluo Jiannao Tablets (Class 1.1) for the treatment of vascular dementia, and Yangxue Qufeng Zhitong Granules (Class 1.1) for the treatment of tension-type headache.

Table 4 Analysis of the varieties under review for NDA of innovative TCM

No.	Drug name	Classification	Enterprise name	Indication
1	Binaqi Granule	1.1	Xinjiang Yinduolan Pharmaceutical	Influenza caused by heat
2	Xingming Nasal Tablets	1.1	Beijing Yiling Pharmaceutical	Persistent allergic rhinitis
3	Hydroxysafflor Yellow A Injection	1.2	Guangzhou Yuankang Biology	Acute ischemic stroke
4	Niuhuang Children's Antipyretic Plaster	1.1	Jianmin Pharmaceutical Group	Fever in children
5	Kehou Qing Capsule	1.1	Guizhou Ruihe Pharmaceutical	Acute pharyngitis
6	Zihua Warming Lung Anti-cough Granule	1.1	Guangzhou Yuankang Biology	Post-infection cough
7	Tongluo Jiannao Tablets	1.1	Guangzhou Yuankang Biology	Vascular dementia
8	Longqi Capsule	1.1	Jiangsu Kangyuan Pharmaceutical	Lung cancer
9	Pearl Drop Pill	1.1	Guizhou Minzu Pharmaceutical	Recurrent oral ulceration

(to be continued)

Continued Table 4

No.	Drug name	Classification	Enterprise name	Indication
10	Ginseng Polygonum Root Sedative Granule	1.1	Jiangsu Kangyuan Pharmaceutical	Sequelae after prostatitis
11	Dahuang Zhizi Decoction Pills	1.1	Beijing Yiling Pharmaceutical	Chronic cholecystitis
12	Yangxue Zhifeng Analgesic Granule	1.1	Guangdong Fangsheng Health Pharmaceutical	Tension headache
13	Renmu Jianpi Granule	1.1	Nanjing Zhongshan Pharmaceutical	Chronic atrophic gastritis

2.3.2 Clinical application situation of innovative TCM drugs

From 2020 to 2024, there were a total of 190 varieties of IND applications (Fig. 5). Among them, 145 varieties were approved for clinical trials, 28 varieties failed to be approved, and 17 varieties are still under review and approval.

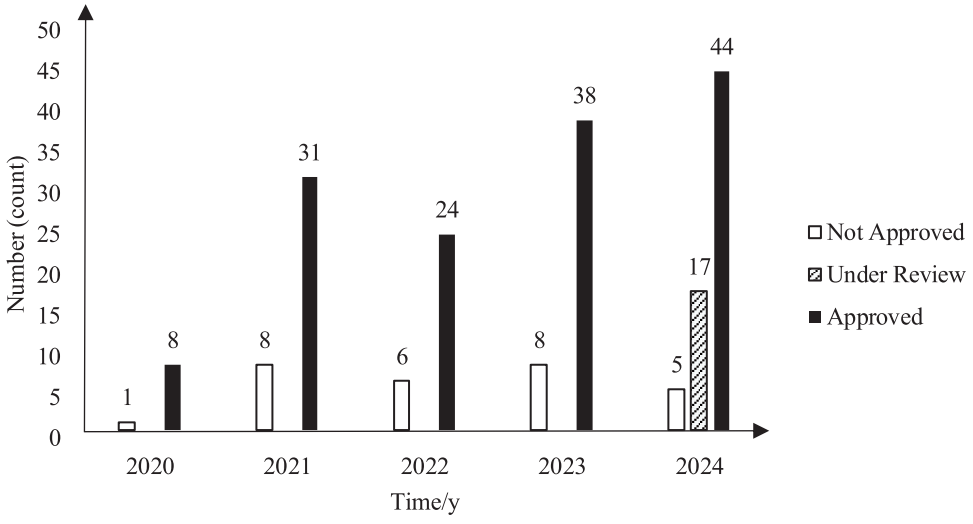

Fig. 5 Number of IND applications for innovative TCM from 2020 to 2024

According to the analysis of the applying companies, 5 IND applications were submitted by companies with more than 5 IND applications. They are Jiangsu Kanion Pharmaceutical Co., Ltd., Beijing Yingke Rui Innovative Drug Research Co., Ltd. and its Tianjin subsidiary, Shijiazhuang Yiling Pharmaceutical Co., Ltd., and Sichuan Academy of Chinese Medicine Sciences.

Jiangsu Kanion Pharmaceutical Co., Ltd. submitted the most Class 1.1 applications, with a total of 14. Among them, 10 were individual applications, and 4 were jointly applications with other companies; 3 of them are under review, 1 failed to be approved, and 10 were approved for clinical trials (2 in Phase II). Beijing Yingke Rui Innovative Drug Research Co., Ltd. and its Tianjin subsidiary have a total of 11 Class 1.1 applications, 10 of which were approved (no clinical trials have been carried out), and 1 is under review. Shijiazhuang Yiling Pharmaceutical Co., Ltd. (including its R&D company in Beijing) has a total of 6 Class 1.1 applications, all of which were approved, with 4 currently in Phase II. Sichuan Academy of Chinese Medicine Sciences has a total of 5 Class 1.1 applications, 1 of which failed to be approved, and 4 were approved (no trials have been carried out).

2.4 Review and approval situation of improved TCM new drugs

In December 2020, the "Implementation

Opinions on Promoting the Inheritance, Innovation and Development of TCM by NMPA [2020] No. 27" [8] proposed to encourage secondary development, formulate relevant technical requirements for the research of improved TCM new drugs, and support the use of new technologies and processes that conform to the characteristics of products as well as new dosage forms that reflect clinical application and characteristics to improve listed TCM varieties. The technical guidance principles for the research of improved TCM new drugs were issued as a draft for comments by the NMPA's Center for Drug Evaluation in January 2023, and the trial version was officially released in May 2025. The proposal of improved new drugs reflects the state's perfection in the full life cycle management of listed products and encourages the secondary development of TCM. This strategy not only endows "old products" with new drug attributes but also points out a new direction for the cultivation of major TCM varieties [9].

2.4.1 Marketing application situation of improved TCM new drugs

From 2020 to 2024, there were a total of 3 marketing applications for improved TCM new drugs. Among them, Xiao'er Disuqing Heat-Clearing Syrup (Class 2.2) from Jichuan Pharmaceutical Group Co., Ltd. was approved in 2023 (Approval Number: Z20230006). It took 313 days from the submission of the marketing application to approval (from January 28, 2023 to December 7, 2023). Qinghouyan Troche (Class 2.1) from Zhejiang Kaen Biotech Co., Ltd. submitted its marketing application in September 2023 and is currently under review (a supplementary materials notice was issued on September 6, 2024). Wantong Jingu Bar Plaster from Tonghua Wantong Pharmaceutical Group Co., Ltd. submitted its marketing application in October 2023. According to the drug delivery document dated August 5, 2024, it has not been approved.

2.4.2 Clinical application situation of improved TCM new drugs

During the period from 2020 to 2024, there were a total of 61 varieties of IND applications (Fig. 6). Among them, 44 were approved for clinical trials, 12 failed to be approved, and 5 are still under review and approval.

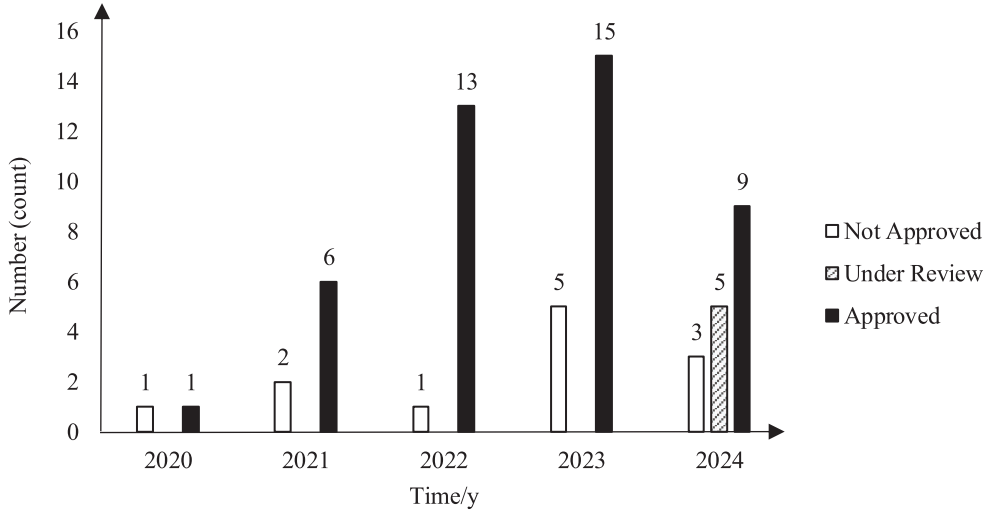

Fig. 6 Number of IND for improved new drugs from 2020 to 2024

Among the improved TCM new drugs, there are a total of 50 varieties in Class 2.3 (including 2 varieties in both Class 2.2 and Class 2.3), 3 varieties in Class 2.1, 7 varieties in Class 2.2, and 1 variety in Class 2.4.

The companies that applied for the IND of improved TCM new drugs total 50. Among them, Jiangsu Kanion Pharmaceutical Co., Ltd. Has the most IND applications for improved TCM new drugs, with a total of 5 varieties, including Songrong Total Glycosides Capsules (CXZL2200011) which have not yet carried out clinical trials, Dazhu Hongjingtian Capsules (CXZL2200010) which have completed Phase II, Jinzhen Oral Liquid (CXZL2200009) which have completed Phase II, Xingbei Zhike Granules (CXZL2300028) which are in Phase II clinical trial enrollment, and Yinyanghuo Total Flavonoids Capsules (CXZL2400088) which are still under review.

2.5 Review and approval situation of traditional classic prescription Chinese materia medica compound preparations

In 2018, the National Medical Products Administration (NMPA) issued the "Administrative Measures for Simplified Registration and Approval of Traditional Classic Prescription Chinese Materia Medica Compound Preparations" [10]. In 2020, the "Drug Registration Management Measures" redefined the registration classification of classic prescription compound preparations. Subsequently, a series of related policy documents and guiding principles were released in succession, aiming to accelerate the modern transformation of traditional classic prescription Chinese materia medica compound preparations. These measures have led to a year-by-year increase in the marketing applications of traditional classic prescription Chinese materia medica compound preparations from 2020 to 2024, with a total of 50 accepted applications (Fig. 7). Currently, a total of 19 have been approved for marketing, 4 have not been approved, and 27 are still under review and approval.

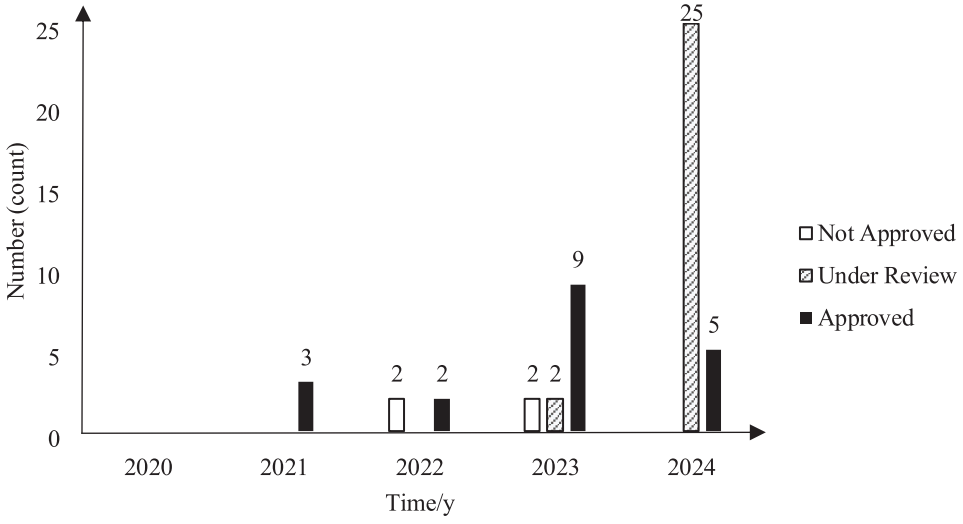

Fig. 7 Number of NDA applications for compound preparations of classic prescriptions from 2020 to 2024

Among the 50 accepted applications, there are 44 in Class 3.1 and 6 in Class 3.2. 19 approved products include 13 in Class 3.1 (Shaoyao Gancao Granules*3, Linggui Shugan Granules*2, Pipa Qingfei Granules*2, Yiguan Jian Granules*2, Jichuan Granules, Wenjing Tang Granules, Danggui

Buxue Granules, and Erdong Granules), and 6 in Class 3.2 (Qingfei Paidu Granules, Huashi Paidu Granules, Xuanfei aidu Granules, Sanhan Huashi Granules, Wenyang Jiedu Granules, and Yiqi Qingfei Granules.).

Among the 16 ancient classic prescriptions in Class 3.1 (Table 5), Linggui Shugan Granules, Taohong Siwu Granules, Pipa Qingfei Granules, and Wenjing Tang Granules generate the most research and development enthusiasm among manufacturers.

Table 5 Statistical analysis of compound preparations of classic prescriptions

Classic formula name	Number of applications	Approved	Under review	Not approved
Linggui Shugan Granules	6	2	2	2
Taohong Siwu Granules	6	0	4	2
Pipa Qingfei Granules	5	2	3	0
Wenjing Tang Granules	4	1	3	0
Erdong Granules	3	1	2	0
Shaoyao Gancao Granules	3	3	0	0
Yiguan Jian Granules	3	2	1	0
Kaixin San	3	0	3	0
Shengxian Granules	2	0	2	0
Jichuan Granules	2	1	1	0
Wuwei Xiaodu Yin Granules	2	0	2	0
Danggui Buqi Granules	1	1	0	0
Taoheti Chengqi Granules	1	0	1	0
Yihuang Granules	1	0	1	0
Yunv Jian Granules	1	0	1	0
Banxia Baizhu Tianma Tang Granules	1	0	1	0
Total	44	13	27	4

3 Discussion

3.1 Increasing innovative vitality of TCM in China

China demonstrated significant progress in TCM inheritance and innovation from 2020 to 2024. According to the 2020 version of the drug registration management measures, a total of 96 NDAs (44 Class 1, 3 Class 2, and 49 classic prescription compound preparations) and 283 INDs (221 Class 1 and 63 Class 2) were accepted. By contrast, during the period from 2015 to 2019, there were just 28 NDAs and 160 INDs accepted [11].

The main reasons for the increase in the number of IND and NDA are the optimization of the policy environment. The revision of the "Drug Registration Administration Method" in 2020 clarified the R&D path oriented by clinical value, and accelerated the review process through mechanisms such as conditional approval and priority review. At the same time, the state has incorporated the development of TCM into the "14th Five-Year Plan" and encouraged the inheritance and innovation of TCM, introducing relevant policies

to encourage the development of TCM. In addition, technical guidance principles, such as the "Special Provisions for the Registration Administration of traditional Chinese medicine", allow applications based on data from classic prescriptions and human experience, reduce the requirements for repetitive clinical trials, and improve the feasibility of R&D. The dividends of the above policies have been released intensively, providing institutional guarantee and clear expectations for the application of TCM, and injecting new vitality into the R&D and innovation of TCM preparations.

3.2 Significant improvement in the efficiency of approval for new TCM drugs

For the six innovativeTCM products that were marketed according to the 2007 version of the registration classification, the average approval time was 865 days (Qi Jiao Tiaojing Granules was excluded since its approval took 3709 days due to the "722" verification in 2015.). In contrast, the average approval time for the 17 innovative TCM products that were marketed according to the 2020 version of the registration classification was 377.5 days, demonstrating significant optimization of the review and approval process.

3.3 Improvement of the R&D level of TCM enterprises

If the R&D capabilities of enterprises are enhanced, the novelty of their innovative drug research and development, the quality of preclinical and clinical research, and the likelihood of obtaining regulatory approval for the results will all increase. Therefore, the approval rate changes of IND and NDA for TCM R&D enterprises indicate their R&D capabilities.

For example, the approval rate of NDA for 38 innovative TCM Drugs declared by enterprises during the period from 2020 to 2024 is 50.0% (including 13 varieties that are under review). During the period from 2007 to 2019, the number of accepted applications for new TCM drugs' NDA was 294, with 45 approved, making the overall approval rate 15.0% [11].

3.4 Functional expansion and indication enhancement in the secondary development of TCM

Among 61 varieties of improved TCM new drugs, there are 50 in Class 2.3, accounting for 82.0% of the INDs. There are three potential reasons why TCM enterprises mainly focus on expanding functions and indications in Class 2.3 as their R&D direction:

(1) The direction of expanding indications is based on feedback from clinical practice, which increases the possibility of obtaining positive results in clinical trials; (2) The evidence system for TCM review combining "three aspects" is gradually improving. Data from the real world can be used as part of the review basis, shortening the R&D cycle; (3) Based on the application materials for the first indication, it is possible to exempt from pharmacological and toxicological studies, resulting in relatively low R&D costs.

3.5 Ancient classic prescription compound preparations: Emerging strategic focus for TCM R&D enterprises

The theory of TCM practiced for thousands of years, has yielded invaluable heritage and essence of ancient classic prescriptions. Delving into these ancient classic prescriptions and transforming them into patent medicine preparations to benefit a wide range of patients unlock the treasure house of TCM. This process aligns with the national concept of inheriting the essence of TCM, upholding the right path, and daring to innovate. At the same

time, the research and development cycle of classic prescription preparations is short. Since there is no need to conduct clinical trials, the research and development costs are also relatively low. Therefore, the research and development enthusiasm for classic prescription compound preparations has gradually increased. Currently, it has become a key research and development area that patent medicine research and development enterprises focus on. A total of 27 TCM enterprises have submitted NDA applications for ancient classic prescription compound preparations. The enterprises that have submitted more than three NDA applications are Jiangsu Kanion Pharmaceutical Co., Ltd. and Shenwei Pharmaceutical Group Co., Ltd., each submitting six listing applications; China Resources Sanjiu and its subsidiaries (Hefei China Resources Shenlu Pharmaceutical, China Resources Sanjiu Ya'an, and Anhui China Resources Jinchan Pharmaceutical) have jointly submitted six listing applications; Jilin Aodong Taonan Pharmaceutical has submitted three listing applications.

3.6 Differentiated R&D Strategies of TCM enterprises from the perspective of IND/NDA application

When deeply analyzing the innovative TCM IND and NDA application enterprises, it is not difficult to find that each major enterprise is actively expanding its R&D pipeline to consolidate its market position and promote innovation and development in the industry. Different enterprises employ different R&D strategies.

Jiangsu Kanion Pharmaceutical Co., Ltd. has a comprehensive R&D pipeline layout with products distributed among different registration categories. Two innovative TCM drugs and four classic prescription compound preparations have been approved. In addition, ten Class 1.1 INDs and four Class 2.3 INDs have been approved, too.

Shijiazhuang Yiling Pharmaceutical Co., Ltd.'s R&D pipeline focuses mainly on innovative TCM drugs. Four innovative TCM drugs have been approved, and two are under review for NDA. Additionally, five Class 1.1 INDs and two Class 2 INDs have been approved, too.

Beijing Yunkuiruizhong Innovation Drug Research Co., Ltd. is a rising star in the layout of innovative drugs, with ten approved Class 1.1 INDs.

Shenwei Pharmaceutical Group is highly focused on the research and development of classic prescription compound preparations and has submitted six NDA applications for listing.

4 Summary and prospect

With the promulgation of regulations such as the "Drug Registration Administration Method" and the "Special Provisions for the Registration Administration of traditional Chinese medicine", TCM regulatory system has been improved, and the review and approval process has been optimized. At the policy level, these regulations have encouraged the innovation of TCM compound preparations.

Enterprises have responded to national policy direction with growing enthusiasm for research and development of patent medicines. The number of IND and DNA for first-class and second-class new drugs has increased year by year, and the number of NDA for Class 3.1 has repeatedly reached new highs. These data reflect the achievements made in the inheritance and innovation of TCM in China in the past five years under the guidance of national policies.

Looking forward, with the continuous emphasis and support from the state for the cause of TCM, it is expected that research and development of TCM will prioritize high-quality innovation and clinical application transformation. Enterprises will continue to expand research and development investment in disease areas where patent medicines

have therapeutic advantages. Classic prescription compound preparations will become research and development hot spots due to their short research and development cycles and low costs. In addition, the use of modern scientific and technological means such as big data and artificial intelligence to promote the development of precision medicine research and personalized treatment plans will improve the efficiency and success rate of drug research and development.

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