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Review of Drug Target related Research

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ABSTRACT . *Research on drug targets remain a heated topic in many fields, especially medical development, drug research, biotechnology and so on. This paper mainly introduces three categories of papers on drug targets, namely emphasis on medical experiments, related technologies, and research situation.*
Keywords: drug targets, review, medical experiment, technology

1. **Introduction.** The biochemical Oxford dictionary defines "drug targets" as "a compound interacts with specific biological entities, typically a protein or gene". [Article 1] says drug targets are often of biological macromolecules, which serve as a special compound, capable of "binding site". When the corresponding chemical substances with binding occurs, the structure will initiate appropriate changes, play a pathophysiological role. Pathological conditions, the substance of the expression, activity, or structural characteristics may occur changes, this change may be the primary resistance, and it may be secondary. Furthermore, the presence of substances capable of binding to the endogenous molecule or structure may also be present in the body may be exogenous, which is a binding substance as a drug can be used to control disease.

The goal prediction (recovery) of doing research progress is similar to that of the review class. However, in fact, the target research is continuously developing. The purpose of this kind of review is to understand the progress of targets in a certain subdivided field. In these articles, the conclusion is of vital importance, or under idealized circumstances, a target prediction formed with confidence can be output, and this must be justified. In the work of [2], the article reviews the research progress of anti-arrhythmic effects of natural products. Targets of natural products can increase the slow activation of delayed rectifier potassium

currents and ATP- sensitive potassium ions by inhibiting sodium, L-type calcium, transient outward potassium, and ether-a-go-go and related gene channel currents and steady-state potassium currents. currents; inhibition of micro RNA (miRNA) - 1 expression, miRNA expression profiles altered heart; Effect of Na + -K + -ATP enzyme and superoxide dismutase activity; inhibiting receptor β and angiotensin receptor ii ; modulate lipid metabolism, And then affect the heart rhythm, resulting in anti-arrhythmia effect. The work of [3] associates with the current arrhythmia disease gene and its corresponding overview from traditional Chinese medicine and its different regulating active ingredient often angle gene expression, and antiarrhythmic medicine existing targets may be summed. In order to provide reference for the anti-arrhythmia pharmacology of traditional Chinese medicine.

Of course, one can also find a target based on a decoction research, although the number is small, and this is generally concluded through experiments, through the literature may not be able to recover better results, and the scope of the study will be less. In other words, such as the work of [4], through the literature search obtained Guizhi Tang related active ingredients, and then conducted a medical experiment concluded that: Guizhi Tang and Ying Wei's mechanism and 11β-HSD1 have a certain correlation. In other words, the conclusion is single. However, there is a variety of results obtained in the literature, such as Article [5]. By using the method of mining Liujunzi system pharmacology of key target. Target diseases builds a database of target-disease network based on the information, obtained by statistical analysis Liujunzi attending the disease, ultimately calculated by the central analysis algorithm Jun Zi Tang six of the most important targets are four cyclooxygenase -2 (PTGS2), cyclooxygenase - 1 (PTGS1), γ - aminobutyric acid receptor α- 1 subtype (GARBRA1), PKA catalyst C-α subtype mRNA (PRKACA). Uniprot database sickness binds Liujunzi key information corresponding to the target, the statistics found Party for many ulcerative colitis and inflammation may have a therapeutic effect, while for prostate cancer, breast cancer, solid tumors and other cancers, as well as cardiovascular disease, thrombosis, and Alzheimer's also showed a potential therapeutic effect. In the work of [6], the authors conducted studies on the anti-inflammatory, neuroprotective and vascular regulation of more than 10 chemical components in Buyang Huanwu Decoction to explore the multi-component and multi-target mechanism of anti-ischemic stroke.

In general, scholars from different subdivisions have conducted a lot of research on targets from different perspectives and different subdivision granularity. However, because these researches are scattered, they can focus on different kinds of target prediction and even better utilization of targets. The point brings a certain degree of difficulty. So, from the target of finishing conduct research and understanding the published literature, involve method used, from which conclusions can be drawn irreplaceable significance.

2. **Literature Review of Drug Targets Research.** On numerous research targets, related to diseases and drugs abound, so in accordance with the target disease or drug literature or classify targets are not realistic, and is often difficult to target research is part of a separate discipline, so it is also difficult to achieve according to the division of disciplines, and there is no practical significance.

From the literature review of view, only the top magazines such as Nature only have the ability to target an overview of the full range of research, most scholars are reviewed from a micro level prior to deployment. This article aims to emphasis from medical experiments and emphasis on technical aspects to clarify what current scholars have carried out studies on the target area, then progress to study the different targets Overview. Here refers specifically to medical experiments by treatment of actual patients or laboratory animals, experiments to evaluate the efficacy of, and emphasis on technology especially by treatment data, without going through the experiment (simulation) patients, and usually use data mining techniques. These two types of research have one thing in common, often experimental verification plus literature, or literature research through the experiments.

Of course, because the research targets are more dispersed. From the appearance point of view, lot of technic are self-contained, so the first three categories of research is to explore the Progress summary for a certain type of target, where classification of targets may be based on some sort of or a disease, a symptom of a point or a certain treatment. The study research progress for a general class of the field as a professional who, in order to take full advantage of previous research breakthrough. This classification appears to cross the first two categories, but is actually a field outside sources can be based on different emphasis; from the macro point of view reflects the current state of academic research on target.

In summary, this study will divide into three major targets aspects. According to age literature citations, publication grade, methods and massive coverage of relevant literature manual screening, a total number of 62 papers are selected. We can cover methods of research and types of typical disease in general.

2.1. **Emphasis on Medical Experiments.** Experimental research emphasis medical WESTERN majority of clinical, medical research. Related targets are primarily medical experiments, and researches of new drugs are determined mainly by the clinical effect (analog) or the like to improve the clinical efficacy, often using test and control group medication or surgical method, verification by the target effect, sometimes with animals such as mice as a sample. Typical related documents are as follows:

In the work of [7], the operation method of the experimental group is to determine the position of the target disc tissue diseased section. It concluded that lumbar disc puncture target collimator targeting accuracy, targeting SCIENCES puncture method; trans dermally Intervertebral foramen total endoscopic lumbar discectomy personalized to develop the puncture approach path, the use of targeted targeting of lumbar disc herniation target targeting technology, can significantly reduce the X- ray exposure dose PTELD surgery. In the work of [8], it concludes that the multi-target treatment regimen could better inhibit inflammation, improve cerebral arterial spasm ischemia, inhibit thrombosis, protect nerves, and improve patients' anxiety and depression symptoms. In addition, sleep disorders through comparative experiments on drug treatments between the experimental group and the control group. In the work of [9], for the subthalamic nucleus deep brain stimulation surgery due to a lack of theory puncture, puncture equipment behind the low target location accuracy and big problems caused by head injury, raised intracranial extracranial path

planning frameless positive. The cross-direction method develops a frameless orthogonal oriented automatic puncture platform and a craniocerebral transparent puncture model was established. The puncture experiment is to verify the reliability of the frameless orthogonal orientation method for improving the accuracy of target positioning. In [Article 10], firstly, it discussed the significance of Stathmin expression in gastric cancer tissues and its correlation with chemotherapy efficacy and prognosis. We studied the effect of antisense nucleic acid on gastric cancer cell growth and tumorigenesis, and finally found that Stathmin ASODN enhanced the inhibitory effect of sitaxil on the proliferation of gastric cancer cells. It indicates that the synergistic effect of the combination therapy of the two drugs indicates that the anti- Stathmin targeted therapy has a synergistic anti-tumor effect with chemotherapy, and the clinical benefit of combination therapy is greater. [Article 11] A retrospective analysis of 91 cases HCC single preoperative Gd-EOB-DTPA-enhanced MRI wherein, immunohistochemically expression level in gene therapy of HCC samples after evaluation, eventually found using enhanced Gd-EOB-DTPA MRI can Preoperative prediction of B-Raf and Raf- 1 gene expression levels in HCC. In the work of [12], firstly, the authors got a novel and highly efficient neutralizing antibody against RSV was through a multiplexed immunization scheme that presents RSVFgene with a DNA vaccine vector. Through this antibody, they discovered a novel metastable conformation of F protein and a new anti- RSV. New target. In the work of [13], determined by sequence analysis P53 and PTEN gene subtypes common outer clip mRNA exon region, software scored for the region of design choice guide RNA (sgRNA) of each target for p53 and two CRISPR-Cas9PTEN gene sequencing plasmid DNA was extracted by experiments, and the experimental group compared to control. After sequencing the results of the group was determined RNA-mediated mutation of the specific gene locus and found that P53 and PTEN gene design sgRNA p53- 1, p53-2, and PTEN-2 can successfully mediate site-specific gene editing of Cas9 at a genomic level. [Article 14] briefly describes the role of ALK1 in angiogenesis, angiogenesis and clinical diseases, and its application in anti-angiogenic therapy of tumors. Phase 1 clinical trials have shown that blocking its signal can inhibit tumor angiogenesis. ALK1 has been Become a potential anti-angiogenic therapeutic drug target. [Article 15] CSR treated by the patient, the mechanism of nodule found CSR for treatment after transverse knife target may be nodules tendons and ligaments around the nerve root after release. [Article 16] analyzed 8 cases of datedCL from 2009 to 2017 years, among which 6 was successfully radiofrequency ablation/RBBB combined outflow tract in patients with PVC retrospectively found to interfere with bundle branch block PVC. Analyzing the origins of the heart chamber according to need the intraoperative mapping and ablation results ultimately determine the origin of the PVC heart chamber. In [Article 17], 64 patients with lumbar disc herniation randomly divides into target bipolar radio frequency ablation coagulation combined with ozone treatment and Yip ten steps bone setting treatment as control group. They eventually found bipolar RF target coagulation combined with ozone Treatment of lumbar disc herniation is effective in improving pain and lumbar function in patients, and the curative effect is stable in the near future. The long-term efficacy still needs further observation. [Article 18] using silica gel,

SephadexLH-20 column chromatography and the like and semi-preparative HPLC separation, 14 selected target protein associated with glucose metabolism, molecular docking technology hypoglycemic effect exploration of target compound. It concludes that compounds 1 to 4 were isolated from this genus for the first time. Compounds 5 and 6 may exert their effects through regulation of PTP1B. In [Article 19], mouse experiments prove that the treatment of AKT targets myeloproliferative tumors.

2.2. **Emphasis on Drug Target related Technology.** Research emphasis on technology, computer technology or technology under the usual field of biological medicine, are those studies, which mainly obtain data through a number of medical databases and other channels. Technical means of experimental research techniques and their corresponding drug targets for diseases are used, or carried out by computer-assisted reverse to find target usually data mining technology, network analysis, computer models or create relevant animal models, there are pure do to improve the algorithm, which aims are to improve drug efficacy through accurate forecasting targets, improve clinical results. Typical related documents are as follows:

Many studies based on constructing models of network - such as: [Article 5]. The medical network based on the use of existing medical databases, PPI (Protein-Protein Interaction, protein interaction) network, computer algorithms and associated software, A global study of the interactions of genes/proteins associated with acute ischemic stroke was conducted to identify potential targets and candidate drugs associated with the treatment of acute ischemic stroke. [Article 20] uses ChemDraw, PharmMapper software against osteoporosis potential targets of virtual screening, biological Cytoscape software build regulatory networks, found Ligustrum five components (Laid-glycoside privet, Ligustrum glycosides Gl3, privet glycosides, salidroside, privet oil glycosides), multiple targets can be associated with osteoporosis binding. Ligustrum lucidum screened by the target component by component of Ligustrum lucidum wnt pathway, apoptosis pathway to promote bone formation and inhibiting bone resorption, anti-osteoporosis action integrated multi-target adjustment mechanism provides clues. [Article 21] will select 10 chemical constituents of Pterocarya stenoptera, use related software for data import and storage, use PharmMapper and DrugBank database for target prediction and screening, and pass MAS 3 .0 of database access targets were obtained and analyzed, and finally use Cytoscape 3. 4. Software Construction Pterocephalus grass 0 "active ingredient - target - path" network, the finalconclusion, the grass can be Pterocephalus by acting on inflammation, immune and endocrine related targets and pathways, play a role in the treatment of RA. In [Article 22], according to online TCM bioinformatics analysis tool (BATMAN-TCM) screening targets of dandelion active ingredients, KEGG signal pathway and Gene Ontology data enrichment analysis. The conductor used the Cytoscape software to construct a component - target network of dandelion activity-inhibiting inflammation. Finally, five active ingredients were screened out in dandelion, involving 9 targets of inflammation, and the active ingredients interacted well with the predicted targets. Finally, it concludes that the anti-inflammatory mechanism of dandelion related to targets such as adenylate kinase (ADK), adenosine A1

receptor (ADORA1), and helical loop-domain-diffusion kinase (CHUK). [Article 23] established Eucommia compound molecule in the data set by retrieving the internet Discovery studio analog Peking natural product libraries. By searching the TTD database and related literature, the research targets of delaying cartilage degeneration in Eucommia ulmoides were determined, and the network of eucommia compound - cartilage degeneration targets was constructed. The conclusion was that the main effective material base of Eucommia ulmoides in delaying cartilage degeneration was the getenoid. The mechanism of action of steroids and flavonoids may be to reduce the expression of MMPs and ADAMTS incartilage by inhibiting the expression of IL- 1β and TNF-α in cartilage, while promoting the expression of TGF-β1, thereby reducing cartilage destruction and promoting cartilage Repair eventually delays the progression of cartilage degeneration. In [Article 24], identifying the relationship between new drug targets is the key to current drug research. Based on network of tag propagation algorithms, a strategy of drug target prediction proposed that fuses heterogeneous network information. First, calculate the similarity of drugs and the similarity of targets, and combine the known role of drug targets to build a heterogeneous network. Then, the drug compound and target protein information are fully integrated. The improved tag propagation algorithm performed in turn on the drug similarity and target similarity homogeneous network, and another heterogeneous network receives the information of the homogeneous network during the propagation process. Finally, they have tested on four classical data sets and compared with the network methods BLM-NII and NRWRH. The results show that the ROC and PR curve area can obtain with this strategy, and it has higher prediction accuracy. In [Article 25], establishing a Molecular Data Set of Rong-Jian Bi Tong Fang Compounds on the Discovery studio simulation platform. By searching the TTD database and related literature, the target of treating OA by Rongjin Qutong Decoction was determined. Through molecular docking and biological network technology, the experimenter constructed a network of Rongyan Qutong prescription- OA target to study the treatment of OA with Rongjin Qutong Recipe. The effective substance basis, and the effect of the characteristics of targets, eventually found effective substance basis, Niantong side wing ribs for the treatment of OA and flavonoid glycosides, the main targets of IL- 1β, TNF-α and MMP- 1 It has a broad spectrum of action characteristics in alleviating pain and delaying cartilage degeneration. In [Article 26], honeysuckle and chemical composition are obtained from the database search Radix, targets and diseases related information, and these construct "pharmaceutical - composition - target - disease" network for gene ontology (gene ontology, GO) classification enrichment analysis, based on the gene and pathway enrichment Kyoto Encyclopedia of genome analysis, preliminary verification of the "honeysuckle - Radix" basic pharmacological effects of the drug and its mechanism, and laid a good foundation for further reveal the mechanism of action. [Article 27] obtained the information of chemical components, targets and related diseases of 8 drugs in Qingkailing injection through database search, and constructed a network of “ drug - component - target - disease ” for network topology analysis and preliminary verification. The basic pharmacological effects of Qingkailing injection and its mechanism laid a good foundation for further revealing its mechanism of

action.

In addition to this, the reverse can also find the target. There are three main methods of computer-aided technology in this area: pharmacophore model searching (Compound Profiling), the ligand molecule based on the similarity analysis (Lignad reverse molecular docking (Target Fishing Similarity Search). In [Article 28], the main goal is to establish a method for screening the target mRNA, antisense design using gene therapy and gene function studies, established its own two patented method, a small one sequence cleavage, ligation, Cloning and sequencing, and the other by designing the bridge primers, amplification and connection to complete the connection and sequencing purposes. A library of small fragments were sequenced by the connection sequence, a sequencing reaction times may be obtained 8-20 die segment library of sequences, one twentieth to one-eighth of its original cost of approximately method. This method is fast and economical and can meet the needs of general laboratory applications of RASS and MAST screening targets. [Article 29] present potential targets myricetin prediction using Pharmmap-per DRAR-CPI and internet, the resulting target protein literature mining analysis; bioinformatic analysis of the predicted targets with STRING internet to obtain the target protein annotation, protein interaction information and pathway enrichment analysis. Myricetin eventually found a way to play a role in anti-cancer potential targets and may be associated with PI3K-Akt pathway and MAPK is Pim- 1, EGFR. In [Article 30], the US National Center for Biotechnology Information (NCBI) published 28 Salmonella (serotype 14) genome sequences for the study, obtained from previous studies on Salmonella specific detection of seven targets in Single nucleotide polymorphisms among which different serotypes were compared and analyzed. Experiments showed that Salmonella specific molecular detection targets S9 and S69 combined with Salmonella molecular serotyping ability. [Article 31] compound library 31558 actinomycetes and fungi secondary metabolites crude extracts were screened to construct the recombinant expression strain, human FKBP52 inhibitor established high-throughput drug screening model to achieve a rapid new FKBP52 inhibitor screening, the screening also enables the orientation of the FKBP52-producing bacteria known inhibitors such as FK506, FK520 and rapamycin and the like. In [Article 32] Based on the known 3-OH HEPT- like HIV RT (NNRTI)/IN dual target inhibitors, a pharmacophore model was constructed. TCMD was screened based on the pharmacophore model and Lipinski five rules to find new antibodies. HIV dual target inhibitor. It concludes that the established pharmacophore model and screening strategy laid a good foundation for follow-up studies.

Of course, there are also some studies relatively difficult to define the scope in an accurate way. For example, [Article 33] focuses on the selection of test targets during the detection of steel components in laser-induced breakdown spectroscopy, making full use of LabVIEW in instrument control and machine vision. The superiority of the method realizes the automatic positioning of the test target, and the accuracy and safety of the automatic positioning of the target can improve through the edge extraction. In [Article 34], Chinese medicinal plant-based finishing the studies described target, efficacy, and pharmacological effects of target literature. Screening of target information and standardized treatment,

using frequency analysis and correlation association rules algorithm, study plant-based medicine and medicinal efficacy, target, eventually found a correlation between the presence of certain Chinese herbs, efficacy and target three. In [Article 35], an animal model was established using chronic mother-infant separation and acute cold-restraint stress, respectively. It was finally found that in the IBS animal model with visceral sensitivity as the target, chronic mother-infant separation modelling was more advantageous.

2.3. **Summary of Target Research Progress.** The research progress category also includes the summarization and summarization of predecessors ' technical means for a certain subdivision target in order to provide research or clinical reference, similar to the summarization of relevant research on targets with different subdivision granularity. Typical related documents are as follows:

There are many people before the study based on disease targets, primarily to achieve better therapeutic effect. [Article 36] found that anti-HBV targets research focused mainly on the targeting of anti-HBV, and host cells immunomodulatory agents in the differentially expressed genes and proteins of the HBV infection and the like, from the perspective of the current targeted against HBV study described progress. In [Article 37], the author reviewed osteosarcoma tumor occurrence and development of abnormal activity related potential therapeutic target genes, proteins, cytokines and inflammatory cytokines. [Article 38] nearest five years to combat the current situation related to antithrombotic therapy and research targets related to the AT form, and for the above targets. [Article 43] compiled a thematic review of the new National Cancer Center Singapore is still in early development stages of lung cancer targeted therapy drugs. [Article 39] briefly introduces the markers of lung cancer stem cells, their abnormal signaling pathways, et al., and outlines therapeutic strategies for targeting lung cancer stem cells. In [Article 40], the author reviewed the corresponding changes in endothelin and its receptors after cerebral ischemia combined with the corresponding targets in their signaling pathways. In [Article 41], the author reviewed a comprehensive review of diseases including genome level, transcriptome level, and proteome level. The transcription group refers to the sum of all gene transcription products of a particular organism in a certain state. [Article 42] mainly introduced the physiological functions of TRPC6 in the nervous system and pathological mechanisms in CNS diseases such as stroke, Alzheimer's disease and epilepsy, and related studies using it as a drug target. The article also summarized and discussed the problems to solve in further research, and looked forward to the prospects of using TRPC6 as a target for drug development.

In addition, a review target based on studies, such as a certain type of inquiry whether a target suitable for treatment of a diseases or condition, such as [Article 43]. Presenting on the existing targets and novel target analgesia brief, the article aims to provide a reference for the research and development of novel analgesic drugs that have little adverse reactions, intolerance, and addiction, as well as clinical applications. [Article 44] found that the selection of CAR-T therapeutic target cannot apply the selection criteria of traditional

antibody therapeutic target, but should seek stricter tumor-specific antigen as a target. [Article 45] molecular target for ovarian cancer research part describes the progress of drug targets, in order to provide reference molecular targeted therapies in the treatment of malignant tumors. In [Article 46], according to the improvement of the symptoms of PD patients after DBS after different targets. In [Article 47], according to the published literature, for multi-target anti-Alzheimer disease drugs flavonoids are summarized in order to provide an important theoretical basis for multi-target anti-AD drug development. [Article 48] reviewed the structure and function of GPC3 and GPC3 based on the progress of liver cancer immunotherapy targets, and discuss its future as a liver cancer therapeutic target prospects. [Article 49] reviewed the recent status of research in the host as a target of several anti-HBV drugs.

In addition to exploring the effects of certain targets on the disease or symptoms, there are also many scholars conducting potential targets for some diseases based on a certain protein or compound. In Article [50] from the relationship between liver fibrosis and oxidative stress, DJ The overview of - 1 protein, the role of DJ- 1 in the treatment of hepatic fibrosis review the role of DJ- 1 protein in the treatment of liver fibrosis and its research progress, and analyzed it as a new target for the treatment of hepatic fibrosis. Advantages, disadvantages, and application prospects. In [Article 51], HSP70 classification review of progress in HSP70 function and drugs that target Structure. In [Article 52], combined with the My co-bacterium tuberculosis database and protein function information, the final screening of nine proteins may be the potential target of HY- 152E anti-tuberculosis effect, which laid the foundation for the subsequent study of HY- 152E anti-tuberculosis molecular mechanism. [Article 53] proposed that there are few studies on the role of histone modification in arsenic carcinogenesis. Therefore, the in-depth study of the role of histone modification in the arsenic carcinogenesis process not only enriches the apparent role of arsenic, but also has an important significance in advancing the mechanism of arsenic carcinogenesis. [Article 54] presents Annexin A5 has a high affinity for phosphatidylserine, which is expected to become a new tumor diagnosis and treatment markers and anti-tumor targets. [Article 55] shows CD13 involved in research related to the mechanism of liver cancer cells resistant to forming and summarized, we found that CD13 is involved in the formation of liver cancer cells resistant driving factors, is expected to be reversed liver cancer cell drug resistance and clinical treatment of liver cancer Key target.

Alternatively, some scholars study the role of target on specific diseases based on genes, such as [Article 56]. The article finds that FGFR family (FGFR1-4) gene changes are present in about 12%of SqCLC, is the highest frequency of tyrosine mutations in SqCLC The acid kinase family genes, together with many small molecule drugs targeting FGFR, have played a good therapeutic effect in various types of tumors, and may provide new strategies and directions for SqCLC therapy. [Article 57] summarized tumor promotion mechanism Six1 gene overexpression, Six1 affect TGFβ focus on how this network path and a possible drug target.

Of course, there are purely theoretical studies on targets, such as [Article 68] which mainly summarizes the three aspects of receptor targets, peptide targets, and target

molecular targets. There also existed target- related technical studies, such as [Article 59]. The author retrospectively reviewed what coordinates position GPi for the past 20 years of operation with an attempt to determine the meaning of the applicable general GPi coordinates, and introduces the application and development of MRI technology in GPi target positioning surgery. For targeted therapy orresearch, such as [Article 60]. In this article, the author reviewed EGFR from transport into several areas, nuclear EGFR and clinical characteristics and radio sensitivity relations with targeted therapy. Some research progress are more difficult to classify, evidenced with [Article 61], which will be summarized and concluded in accordance with the mechanism of action of prazosin horses, pharmacokinetics, clinical studies and adverse events. The discovery of new antipsychotic aripiprazole is epinastine 5 - Serotonin and dopamine activity regulators, a significant effect on schizophrenia, which is able to assist in the treatment of major depression; common adverse reactions are akathisia and weight gain, patient tolerance, and other atypical antipsychotics. Compared with drugs, the adverse reactions were slight. [Article 62] summarized research on the mechanism of action of Txnip, and regulation of gene expression, the relationship between type 2 diabetes and related Txnip target drugs. It concludes that Txnip not only affects the secretion of insulin from islet B cells, regulates cell dysfunction, but also has an important regulatory effect on oxidative stress-induced apoptosis of islet B cells.

3. **Conclusions.** In summary, the first two categories of literature are more difficult to sum up in terms of related studies on drug targets as many articles in both of these aspects are longer in length and more narrative in experiments, and the path from the research method to the conclusion is more complex. The basis for the conclusion is the experiment, which is often a literature verification experiment or experimental verification literature, and the focused particle size is relatively small. If you continue on literature research, you may consider starting with articles such as [research progress] and [research status] because such documents are relatively clear. Or, starting from a relatively mature [target review research], such as research on target points based on hypertension, liver cancer, gastric cancer, and colorectal cancer, reverse search for research literature related to the concept points involved in the literature, such as these documents References. Though the target research can be based on on a drug, such as a decoction, it is relatively small but worth trying. However reasonable in theory, these articles are scattered in conclusion, which makes the difficult start. In addition. In addition, there exist many software and platforms on drug studies, most of which focus on prediction based on real medical data targeted to professionals. Thus, with the fast publishing of papers in these fields, a software or platform, which could support drug target review or article verification, would be welcomed as they can help receive the development of a particular aspect of target point development without reading thousands of articles. To those who are of interests, starting from article verification of a particular drug target, mostly part of an article might be a good choice.

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REFERENCES

[1] P Kumari, A Nath, R Chaube. Identification of human drug targets using machine -learning algorithms [J]. Computers in Biology & Medicine, 2015, 56 (56C):175- 181.

[2] Yaosheng Bo, Hao Jianhui, Li Xuguang, et al. Progress on arrhythmic targets of anti-natural products [J] Chinese Journal of Pharmacology and Toxicology, 2016, (2):.. 151- 157 DOI:. 10.3867/j.issn.1000 -3002.2016.02.010.

[3] Julie, a Tailing, Choi Young. Research progress on target heart rhythm regulation and standard anti-arrhythmic medicine [J] DRUGS, 2016, (1):.. 165- 174 DOI:. 10.7501/j.issn.0253-2670.2016 .01.025.

[4] Shi Xueli, Guochao Feng, Xia Meng. Guizhi soup in reconciling health of potential targets based on reverse molecular docking study [J] Chinese pharmacy, 2017, (25):. 3479-3483 DOI:. 10.6039/j.issn. 1001-0408.2017.25.07.

[5] Sun Liang, Yifei, Lu Xueqiu. Mining and other key target for pharmacological Liujunzi-based system and method for the treatment of diseases [J] Global Chinese medicine, 2018, (2):.. 216-222 DOI:. 10.3969/j.issn. 1674- 1749.2018.02.013.

[6] Zhang Weiwei, Xu Feng, Yang Hua, et al. Study on Mechanism of Buyanghuanwu Decoction with Multi-component and multi-target Anti-ischemic Cerebral Apoplexy[C].//2013 Chinese Pharmaceutical Congress & The 13th China Pharmacist Week. Peking University, 2013: 1-3.

[7] Zeng Yuedong. Methodology and clinical application of research on Lumbar disc targets collimator R & D and innovation targeted puncture [D]. Southern Medical University, 2016.

[8] Zhang Zhijun, Wang Baoliang. Efficacy of Multi-target primary headache treatment [J] Chinese Journal of Practical Nervous Diseases, 2017, (22):. 16- 19 DOI:. 10.3969/j.issn.1673-5110.2017 .22.005.

[9] Li Yan. Research on Deep brain stimulation electrodes intracranial puncture mechanism and target oriented technology [D]. Shandong University, 2017.

[10] Liu Xiaolin. Mechanism of Stathmin as a new target for gene therapy of gastric cancer [D]. Shandong University, 2017.

[11] Huang Kun, Dong Zhi. Gd-EOB-DTPA enhanced MRI prediction of gene therapy target expression in hepatocellular carcinoma [J] .Image Diagnosis and Interventional Radiology, 2018,(1):15-22. DOI:10.3969/ J.issn.1005-8001.2018.01.003.

[12] Zhao Min. Research on efficient neutralizing antibodies anti-respiratory syncytial virus and new targets [D]. Xiamen University, 2015.

[13] Hsu Shu, Hu Zheng, Yang Guang, et al. Tumor suppressor gene p53 and PTEN of CRISPR-Cas9 guide RNA target screening and verification efficiency [J] Jilin University (Medical Sciences),2018, (2): 235-242, forward runs 1. DOI: 10.13481/j.1671-587x.20180206.

[14] Yao Dingjin, Luo Zhijun, Ying Ying. ALK1: A new antiangiogenic drug target [J]. Journal of Nanchang University(Medical Sciences), 2017,(5):90-93. DOI:10.13764/j.cnki.ncdm. 2017.05.022.

[15] Zhao Qiao, Liu Longzhong, Yangsheng Bo. Other mechanisms nodules after nerve root cervical disease research [J] is the target for treatment of knife China Journal of Modern Medicine, 2017, (17):.. 62-65 DOI:. 10.3969/j. issn.1005- 8982.2017.17.013.

[16] Ruan Chengye, Wan Zheng, Li Kang, et al. Characteristics of electrocardiogram and ablation target maps in patients with complete left/right bundle branch block and outflow ventricular premature beats [J] .Chinese Journal of Internal Medicine ,2017,(12):919- 923. DOI: 10.3760/cma.j.issn.0578- 1426.2017.12.006.

[17] Dong Xiaoyang, Feng Zhen. Deep brain Progress of coma awaking stimulus target [J] Chinese Journal of Rehabilitation Theory and Practice, 2016, (7):. 801-803 DOI:. 10.3969/j.issn.1006-9771.2016.07.013.

[18] Wu You Nan, Dong Lin, Li Yi Ying, et al. Trickle rotten root bark chemical composition of the target and its anti-diabetic screening study [J] Chinese modern medicine, 2017, (7):.. 956-959 DOI:. 10.13313/j. Issn.1673-4890.2017.7.010.

[19] Yu Jin, Huang Zan, and Fan Jingyi. AKT: a therapeutic target for myeloproliferative tumors [J]. Chinese Journal of Experimental Hematology, 2017, (4): 1105- 1112. DOI:10.7534/j.issn.1009-2137.2017. 04.026.

[20] US war, Zhoujia Jie, Wuqi Cong, Ligustrum lucidum and other components of the potential role of anti-osteoporosis target for virtual screening [J] world of Chinese Medicine, 2017, (7):.. 1693 - 1697 DOI:. 10.3969/j.issn. 1673-7202.2017.07.053.

[21] Tang Ce, Wen Jing, Yang Juan, et al. Network pharmacology of active ingredients of Tibetan medicine Pteridocephalus against rheumatoid arthritis [J] .China Pharmacy, 2017, (19): 2666-2670. DOI: 10.6039/j.issn.1001-0408.2017.19.21.

[22] Wang Tengyu. Fundamental research on white bioinformatic prediction dandelion intervention inflammation "efficacy Network" and mechanism [J] of Traditional Chinese, 2018, (2): 73-75.

[23] Zhengchun Song, Fu Zhanglong, Lin Jie, et al. Usage of a compound-the target network of delayed prediction eucommia based on effective substance and mechanism of cartilage degeneration [J] of Orthopedics and Traumatology, 2017, (12): 6- 10,18.

[24] Yan Xiaoxiao, Kang Lei, Li Runzhou. Label propagation algorithm based on heterogeneous network for drug target prediction [J].Application Research of Computers, 2017,(4): 1011- 1013,1017. DOI:10.3969/j.issn.1001-3695.2017 .04.012.

[25] Zhengchun Song, Fan Zhan, Baozhi Ye, et al. Computer-aided simulation of effective substance basis of wing ribs osteoarthritis, targets and their characteristics [J] of Orthopedics and Traumatology, 2017, (10): 20-24. DOI: 10.3969/j.issn.1001-6015.2017.10.003.

[26] Wu Jiarui, Lin Meng Juan, Liu Xin. Research on "Radix honeysuckle" drug mechanism of action based network pharmacology[J] Evaluation and Analysis of Chinese medicine hospitals, 2018, (1): 12- 17 DOI: 10.14009/j.issn... 1672-2124.2018.01.003.

[27] Sun Liang, Yifei, Lu Xueqiu, Liujunzi. Mining and other key target for pharmacology-based system and method for the treatment of diseases [J] Global Chinese medicine, 2018, (2):.. 216 -222 DOI:. 10.3969/j.issn. 1674- 1749.2018.02.013.

[28] Mao Jianping. mRNA structure of target RASS screening of new methods of research [D] PLA Military Academy of Medical Sciences; PLA Military Academy of Medical Sciences Institute of Radiation Medicine, 2004.

[29] Ho Kan Liang, Li Bo, Yuan Qiuzhen. Myricetin potential targets and mechanisms of virtual screening

study [J] Shaanxi Medical Journal, 2017, (12):. 1633- 1635 DOI:. 10.3969/j.issn.1000-7377.2017.12.003 .

[30] Shixiu Qing, Zhouxiu Juan, Shi Chunlei. Identifying Salmonella specific detection target site and the nucleotide differences determined force serotypes[J] FOOD SCIENCE, 2017, (24):. 47-52 DOI. :10.7506/spkx1002-6630-201724008.

[31] Orchids Li, Zhao Feng, Xu Yan. Establishing FK506-binding protein 52 and the application of high-throughput drug screening model targets [J] Chinese Journal of Antibiotics, 2018, (1): 22-27.

[32] Xiaoze Yun, Kai, Li Aixiu, et al. Novel HIV reverse transcriptase enzyme and integrated dual target virtual screening Inhibitors [J]. Chinese Medicine, 2017, (27): 4-7,20.

[33] Ma Cuihong, Zhaoyue Hua, Meng Wei. LIBS steel composition automatic positioning line detection targets [J]. Chemical Analysis, 2017, (12): 1-6 DOI:. 10.13228/j.boyuan.issn. 1000-7571.010128.

[34] Xiaoyu letter, Wang Naizhi, Zhangjing Wen, et al. Plant cold heat herbal medicine based on data mining[J]. Chinese Journal of Traditional Chinese Medicine Information, 2017, (6): 91 -96. DOI: 10.3969/j.issn.1005-5304.2017.06.023.

[35] Yan Yan, Ren Xiaoyang, Liu Yaping, et al. Evaluation of rat model of irritable bowel syndrome with targeted visceral hypersensitivity [J]. Journal of Gastroenterology and Hematology, 2017, (11): 1263 - 1267. DOI: 10.3969/j.issn.1006-5709.2017.11.017.

[36] Zhao Yanan, Li Hong. Research progress on anti-hepatitis B virus target [J]. International Journal of Virology, 2017, (3): 197-200. DOI:10.3760/cma.j.issn.1673-4092.2017. 03.012.

[37] Wang Dan, Zhang Hanyu, Liu Liang. Molecular basis and potential therapeutic target of human osteosarcoma [J]. Journal of Beihua University (Natural Science), 2017, (6): 747 -750. DOI: 10.11713/ J.issn.1009-4822.2017.06.010.

[38] Li Long, Pei Junping. Advancesof therapeutic targets and new drugs for arterial thromboembolism research [J]. Journal of China Pharmaceutical University, 2017, (3): 251-258. DOI:10.11665/j.issn.1000-5048.20170301.

[39] Lai Hung Jin, Lin Feng, Chen Nan, et al. Advances in cancer treatment strategy targets cancer stem cells as [J]. Chinese Journal of Lung Cancer, 2018, (1): 57-62 DOI:. 10.3779/j.issn. 1009-3419.2018.01.08.

[40] History Ying, He Mingli. Endothelin system multi-target Advances in acute ischemic stroke intervention low perfusion improvement [J]. Chinese Medicine, 2018, (1): 39-42 DOI. : 10.3760/cma.j.issn.1671-8925.2018.01.007.

[41] Chen Lijie, Liang Jingyao, Liu Yumei, et al. Progress in transcriptomes and target therapy of atopic dermatitis [J]. Chinese Journal of Dermatology, 2018, (2): 157- 159. DOI:10.3760/cma.j .issn.0412-4030.2018.02.025.

[42] Qu Zhongwei, Zhang Hui, Wang Yizheng. The pathophysiological mechanism of transient receptor potential type 6 channel in major central nervous system diseases and its prospect as a drug target [J]. Chinese Journal of Pharmacology and Toxicology, 2017,(11):1084- 1090.DOI: 10.3867/j.issn.1000-3002.2017.11.008.

[43] Su diffuse, Zhu Qing, Li Junxu. Analgesic drug targets research status point. [J] Chinese Pharmacological Bulletin, 2018, (2): 161- 165 DOI:. 10.3969/j.issn.1001- 1978.2018 .02.004.

[44] CAR-T Hematologic Tumor Target Hotspot Focusing [J]. People's Liberation Army Medical Journal, 2017, (11): Feng 3.

[45] Feng Linsen, Wang Yufeng. Research progress of potential new target drugs for targeted therapy of

ovarian cancer [J]. International Journal of Pharmaceutical Research, 2017, (10): 909 -913. DOI: 10.13220/j.cnki.jipr.2017.10 .001.

[46] Song Gang. Efficacy characteristics of deep brain stimulation of different targets in patients with Parkinson's disease [J]. Nervous Diseases and Mental Health, 2017,(12):867-871. DOI:10.3969/j.issn.1009 -6574.2017.12.009.

[47] Yuan Lijuan, Wang Keren, Sang Zhipei. Advances in disease activity of multi-target anti-Alzheimer's flavonoids [J]. Chinese Pharmaceutical University, 2018, (1): 10- 19. DOI: 10.11665/j.issn.1000 -5048.20180102.

[48] Xia Lijie, Zhang Fuchun. Research progress of new target GPC3 for liver cancer treatment [J]. Chinese Pharmacological Bulletin, 2016, (11): 1486- 1489. DOI:10.3969/j.issn.1001- 1978.2016.11.002.

[49] Ming-Jie Liu, Wang Yan, Wang Qinying. Advances in host as a target of anti-HBV drugs [J]. Chinese Journal of Primary Medicine, 2017, (16): 2548-2550 DOI:. 10.3760/cma.j .issn.1008-6706.2017.16.040.

[50] Li Jun, Chen Pan, Chen Xiao, et al. Treatment of hepatic fibrosis with DJ- 1 protein as a target [J]. Chinese Pharmacological Bulletin, 2018, (3): 309-312. DOI: 10.3969/j.issn.1001- 1978.2018.03.003.

[51] Liu Zongliang, Zhang Renmei, Meng Qingguo. Research Progress of drugs targeting heat shock protein HSP70 [J]. Journal of China Pharmaceutical University, 2017, (4):416-424. DOI:10.11665/j.issn.1000 -5048.20170405.

[52] Chen Ruixiang, Ge Wenxue, Qin Yunhe, et al. Targeted analysis of anti-tuberculosis active compound HY- 152 E [J]. Microbial and Infection, 2018, (1): 21-26. DOI: 10.3969/j.issn. 1673-6184.2018.01.005.

[53] Yang Yanmei. Paying attention to the role of histone modification in the process of arsenic carcinogenesis, and promote the arsenic role of the target [J]. Chinese Journal of Endemiology, 2018, (2): 87-90. DOI:10.3760/cma .j.issn.2095-4255.2018.02.001.

[54] Ni Tengyang, Wang Haibo, Liu Yanqing. The role of annexin A5 in tumors and its basic research for targeting [J]. International Journal of Oncology, 2017, (11): 842-845. DOI: 10.3760 /cma.j.issn.1673-422X.2017.11.009.

[55] Guo cut, Xu Li, et al. CD13 Progress targeting the mechanisms of drug resistance hepatocellular carcinoma cells [J]. Chinese pharmacy, 2017, (32): 4592-4595 DOI:. 10.6039 /j.issn.1001-0408.2017.32.34.

[56] Dong Ming, Li Wei, Chen Jun. Research progress of FGFR as a potential therapeutic target for lung squamous cell carcinoma [J]. Chinese Journal of Lung Cancer, 2018, (2): 116 - 120. DOI:10.3779/j.issn. 1009-3419.2018.02.05.

[57] Zhao Lijiao, Sun Hui, Lu Jing, et al. Mechanism of abnormal expression of Six1 gene and its drug targets [J]. Modern Oncology Medicine, 2017, (20): 3375-3378. DOI:10.3969/j.issn. 1672-4992.2017.20.046.

[58] Tian Yuhang, Liu Yu, Liang Xitian, et al. Research progress on targeted therapy for liver cancer [J]. Modern Oncology Medicine, 2018,(5): 776-779. DOI:10.3969/j.issn.1672- 4992.2018.05.032.

[59] Deng Xinping, Na Zhao, Yu Wang. MR positioned globus pallidus Parkinson targeted on coordinating operation portion of the image [J]. Magnetic Resonance Imaging, 2018, (1): 74-80 DOI:. 10.12015/issn. 1674-8034.2018.01.016.

[60] Zhang Tingting, Liu Choi, Cheng Guanghui. Nuclear EGFR: The target of potential radiation sensitizer. [J] Journal of Radiation Oncology, 2018, (1): 116- 120 DOI:. 10.3760/cma.j.issn. 1004-4221.2018.01.025.

[61] Fang Shushu, Cao Guoying. Research progress of a novel multi-target antipsychotic drug, iperiipazole [J]. China Pharmacy, 2017, (29): 4174-4176. DOI:10.6039/j.issn.1001- 0408.2017.29.40.

[62] Haoya Nan, Cui Huaqing, Deng Monsanto, et al. Thioredoxin interacting protein and its associated Advances in drug targets [J]. Chinese Pharmacy, 2017, (8): 1136- 1139 DOI:. 10.6039/j. Issn.1001-0408.2017.08.37.