

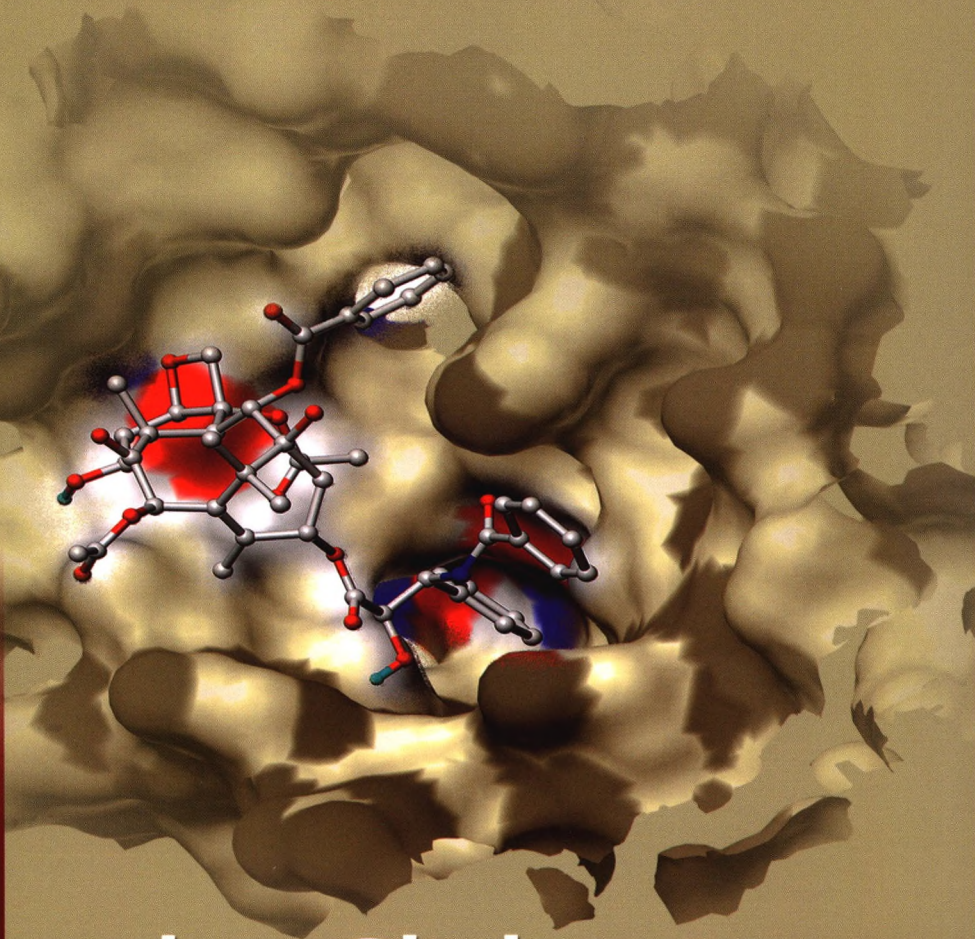


# 药 学 学 报

第54卷

第6期

2019 Vol. 54 No. 6



# Acta Pharmaceutica Sinica

### 专家论坛

余露山, 曾 苏等

2018年中国药物代谢研究进展

万方数据

### 研究论文

周丹丹, 花 芳等

TRIM25增强EGFR稳定性及信号促进肺癌发展



中国药学会  
中国医学科学院药物研究所

# 药 学 学 报

第 54 卷 第 6 期 2019 年 6 月

图 文 摘 要

## 专家论坛

963

### 2018 年中国药物代谢研究进展

余露山<sup>1</sup>, 毕惠嫦<sup>2</sup>, 吴宝剑<sup>3</sup>, 葛广波<sup>4</sup>, 郑江<sup>5,6</sup>, 乔海灵<sup>7</sup>, 曾苏<sup>1\*</sup>

(1. 浙江大学药学院, 浙江 杭州 310058; 2. 中山大学药学院, 广东 广州 510006; 3. 暨南大学药学院, 广东 广州 510632; 4. 上海中医药大学交叉科学研究院, 上海 201203; 5. 沈阳药科大学, 辽宁 沈阳 110016; 6. 贵州医科大学, 贵州 贵阳 550004; 7. 郑州大学基础医学院, 河南 郑州 450001)

该文总结了 2018 年中国学者在 DMPK 领域取得的重要研究成果并展望了该领域未来的研究热点。



## 综述

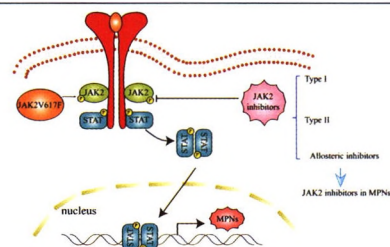
971

### JAK2 抑制剂治疗骨髓增殖性肿瘤研究进展

胡敏, 史高娜, 石建功\*, 张天泰\*

(中国医学科学院, 北京协和医学院药物研究所, 北京 100050)

本文介绍了 JAK2 作为 MPNs 的治疗靶点, JAK2 激酶的功能特点与该疾病的关系以及 JAK2 小分子抑制剂的研发现状。



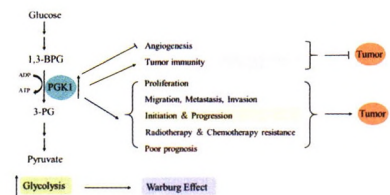
978

### 磷酸甘油酸激酶 1 与肿瘤

王玉英<sup>1</sup>, 戚欣<sup>1</sup>, 李静<sup>1,2\*</sup>

(1. 中国海洋大学医药学院, 海洋药物教育部重点实验室, 山东 青岛 266003; 2. 青岛海洋科学与技术国家实验室-海洋药物与生物制品实验室, 山东 青岛 266237)

磷酸甘油酸激酶 1 (PGK1) 糖酵解过程中关键的催化酶, 对肿瘤细胞能量和物质的供给至关重要。而且 PGK1 作为一种癌蛋白在多种肿瘤细胞中高表达, 促进肿瘤的发生发展, 还与肿瘤患者的不良预后有关, 是肿瘤治疗的潜在靶点。



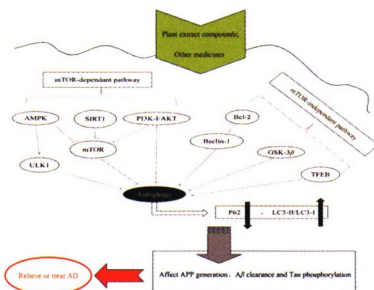
984

### 药物调节自噬治疗阿尔茨海默病

谭成勇<sup>1</sup>, 田慧珍<sup>1</sup>, 况煌<sup>1</sup>, 洪芬芳<sup>2\*</sup>, 杨树龙<sup>1\*</sup>

(1. 南昌大学基础医学院, 江西 南昌 330031; 2. 南昌大学基础医学实验教学中心, 江西 南昌 330006)

一些植物提取化合物和其他药物, 通过各种通路调节自噬, 进而调节可影响体内 A $\beta$  和 Tau 水平的自噬底物水平, 是缓解或治疗阿尔兹海默病有前景的药物。



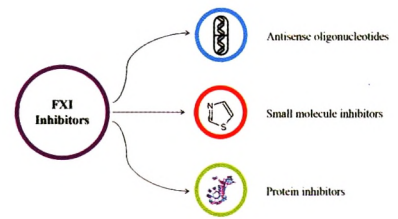
991

凝血因子 XI 抑制剂研究进展

任焱红, 毛自敏, 孔毅\*

(中国药科大学生命科学与技术学院, 江苏 南京 211198)

凝血因子 XI (factor XI, FXI) 是出血风险小的抗凝新靶点。本文综述凝血因子 XI 抑制剂的相关研究进展, 包括反义寡核苷酸类抑制剂、小分子抑制剂和蛋白类抑制剂。



1000

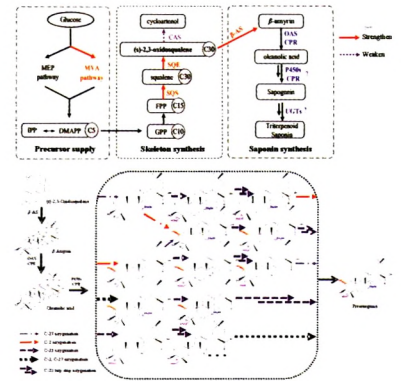
P450s 介导远志皂苷等齐墩果烷型植物三萜生物合成的研究进展

张福生<sup>1\*</sup>, 孔冉冉<sup>1,2</sup>, 陈彤垚<sup>1</sup>, 王倩玉<sup>1,2</sup>, 秦雪梅<sup>1</sup>, 杜晨晖<sup>3</sup>, 马存根<sup>3\*</sup>

(山西大学 1. 中医药现代研究中心, 2. 化学化工学院, 山西 太原 030006;

3. 山西中医药大学, 山西 太原 030024)

本文介绍了齐墩果烷型三萜皂苷和原远志皂苷元的可能生物合成途径。



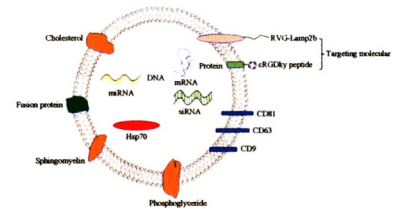
1010

外泌体作为药物递送载体的研究进展

张盈盈, 陈丽青, 刘璇, 辛欣, 孟令玮, 金明姬, 高钟镐, 黄伟\*

(中国医学科学院、北京协和医学院药物研究所, 天然药物活性物质与功能国家重点实验室, 北京 100050)

具有高生物相容性的天然内源性纳米载体—外泌体, 将在药物递送中展现其独特的魅力。



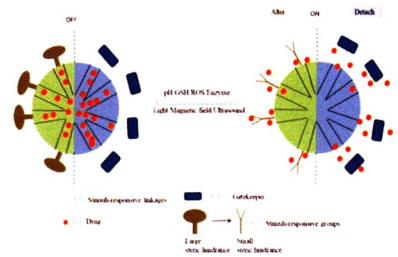
1017

门控型药物递送系统研究进展

张佳<sup>1</sup>, 赵婷<sup>1</sup>, 敦洁宁<sup>1</sup>, 孙明贤<sup>1</sup>, 黄荣荣<sup>1</sup>, 向柏<sup>1\*</sup>, 白靖<sup>2\*</sup>, 曹德英<sup>1</sup>

(1. 河北医科大学药学院, 河北 石家庄 050017; 2. 河北医科大学第四医院药学部, 河北 石家庄 050011)

门控型药物递送系统, 旨在通过门控基团使药物在正常生理条件下处于稳定包载状态。而在肿瘤等病变微环境或外源性因素刺激下, 门控基团脱落或改变实现药物的响应性释放。



研究论文

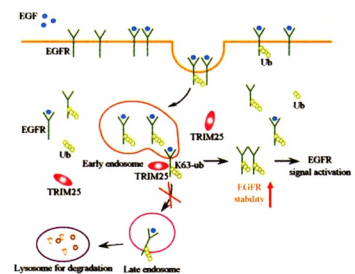
1026

TRIM25 增强 EGFR 稳定性及信号促进肺癌发展

周丹丹, 余娇娇, 胡卓伟, 花芳\*

(中国医学科学院、北京协和医学院药物研究所, 天然药物活性物质与功能国家重点实验室, 新药作用机制研究与药效评价北京市重点实验室 (BZ0150), 北京 100050)

TRIM25 通过促进 EGFR 第 63 位赖氨酸位点发生泛素化修饰, 抑制 EGFR 降解, 增加 EGFR 蛋白稳定性和 EGFR 下游信号的活化。



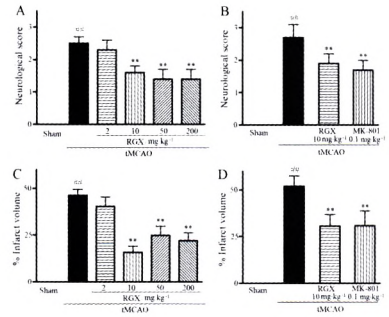
1036

人工麝香对大鼠急性脑缺血再灌注损伤和脑出血的实验治疗

王玲<sup>1</sup>, 李江<sup>1</sup>, 徐少锋<sup>1</sup>, 冯楠<sup>1</sup>, 章菽<sup>2</sup>, 王晓良<sup>1\*</sup>

(1. 中国医学科学院、北京协和医学院药物研究所, 天然药物活性物质与功能国家重点实验室, 北京 100050; 2. 北京联馨药业有限公司, 北京 102628)

灌胃给予人工麝香可显著改善缺血再灌注脑损伤大鼠神经行为学评分和脑梗塞体积。在缺血性脑卒中中, 人工麝香的有效剂量为 10 mg·kg<sup>-1</sup>; 在出血性脑卒中中, 其有效剂量为 200 mg·kg<sup>-1</sup>。



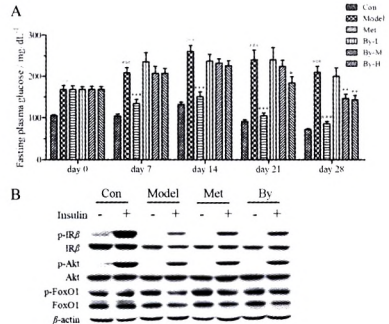
1041

双环醇对 2 型糖尿病 KKAY 小鼠治疗作用的实验研究

王亚男, 张晓琳, 尹震, 田金英, 李雪晨, 叶菲\*

(中国医学科学院、北京协和医学院药物研究所, 新药作用机制研究与药效评价北京市重点实验室, 北京 100050)

双环醇通过改善 T2DM 小鼠肝脏胰岛素抵抗, 降低空腹血糖。



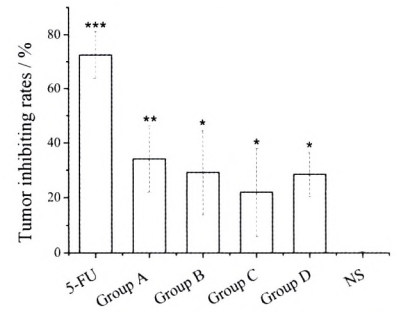
1048

焙制程度对壁虎抑制 H22 荷瘤小鼠肿瘤生长活性的影响

陈心怡, 刘建亭, 邓红梅, 王春梅\*

(北京中医药大学生命科学院, 北京 100029)

以荷瘤鼠抑瘤活性评价壁虎烘焙最佳工艺为 60 °C 烘干不焙。



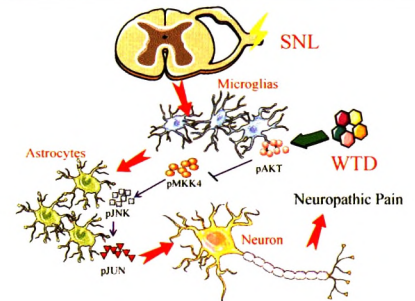
1054

乌头汤缓解神经病理性疼痛的炎症网络调控机制研究

郭秋岩<sup>#</sup>, 李玮婕<sup>#</sup>, 王超, 曹人邛, 李泰贤, 毛霞, 王晓月, 郭敏群, 张彦琼\*, 林娜\*

(中国中医科学院中药研究所, 北京 100700)

乌头汤可通过调节 AKT-MKK4-JNK-JUN 信号轴磷酸化蛋白的表达水平发挥镇痛作用。



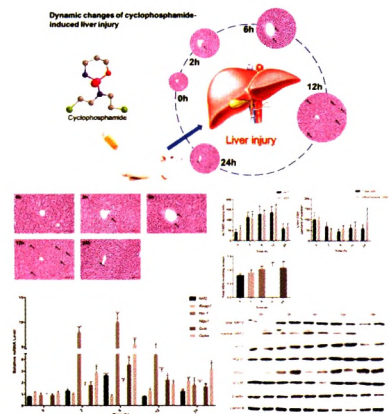
1062

环磷酰胺所致小鼠肝损伤的动态变化

黄灿, 何法静, 杨潇, 官丽欢, 张思敏, 周艳莹, 范仕成, 姚欣鹏, 黄民\*, 毕惠嫦\*

(中山大学药学院药物代谢与药理学实验室, 广东 广州 510006)

本研究阐明了 CPA 所致肝损伤随时间的动态变化过程, 并探讨了 NRF2 保护机制的动态变化, 为抵抗 CPA 所致肝损伤提供新数据。

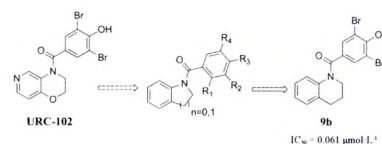


1069

## 尿酸盐转运体 1 抑制剂的设计、合成及活性研究

王永成, 杨亚军, 候现新, 杨颖, 肖志艳\*

(中国医学科学院、北京协和医学院药物研究所, 活性物质发现与适药化研究北京市重点实验室, 北京 100050)

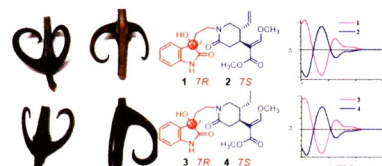
基于 URC-102 设计合成了 14 个新化合物。活性最好的化合物 **9b** 对 hURAT1 的 IC<sub>50</sub> 值为 0.061 μmol·L<sup>-1</sup>。

1075

## 钩藤水提取物中的生物碱类成分

蔡建, 郭庆兰, 李若斐, 王岳, 徐成博, 朱承根, 杨永春, 石建功\*

(中国医学科学院、北京协和医学院药物研究所, 天然药物活性物质与功能国家重点实验室, 北京 100050)

从中药钩藤水煎煮提取物中分离得到生物碱类化合物 **1~4**。其中, **1** 和 **2** 为新化合物; **3** 和 **4** 为新天然产物, 曾由钩藤碱和异钩藤碱转化合成得到并确定绝对构型, 但比旋光报道有误。

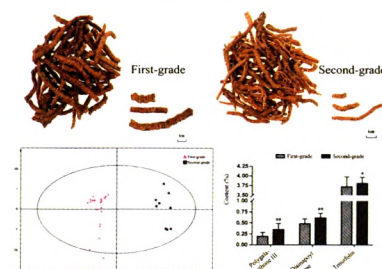
1082

## 不同等级制远志饮片的质量分析

姜雨彤<sup>1</sup>, 高照<sup>1</sup>, 乐智勇<sup>2</sup>, 白宗利<sup>2</sup>, 屠鹏飞<sup>1</sup>, 姜勇<sup>1\*</sup>

(1. 北京大学药学院天然药物及仿生药物国家重点实验室, 北京 100191; 2. 康美药业股份有限公司, 广东 普宁 515300)

建立不同制远志饮片商品等级的划分和质量分析方法, 并对不同等级的制远志进行分析及比较。



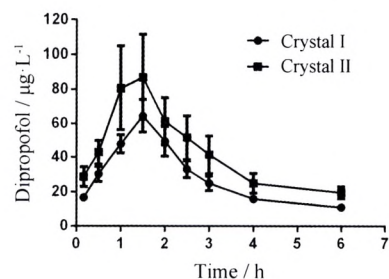
1088

## 两种晶型异丙双酚片剂的比格犬药代动力学研究

郭树攀<sup>1\*</sup>, 王汝涛<sup>1</sup>, 赵熠<sup>1</sup>, 安龙<sup>1</sup>, 肖飒<sup>1</sup>, 秦燕<sup>2</sup>

(1. 西安力邦肇新生物科技有限公司, 陕西 西安 710077; 2. 上海医药工业研究院, 上海 200437)

两种异丙双酚晶型片剂的制备及比格犬药代动力学研究。



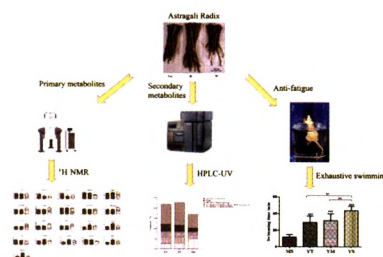
1092

## 黄芪药材等级与化学成分和抗疲劳药效的相关性分析

张瑞<sup>1,2,3,4</sup>, 曹庆伟<sup>1,2,3,4</sup>, 李科<sup>1,3,4\*</sup>, 秦雪梅<sup>1,3,4\*</sup>

(山西大学 1. 中医药现代研究中心, 2. 化学化工学院, 3. 地产中药功效物质研究与利用山西省重点实验室, 4. 化学生物学与分子工程教育部重点实验室, 山西 太原 030006)

黄芪药材等级与化学成分和抗疲劳药效的相关性分析。



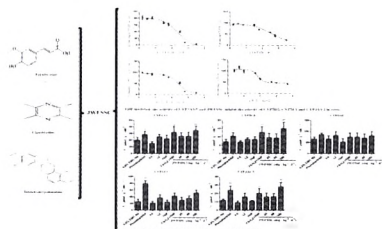
1101

## 加味佛手散胶囊体外对大鼠肝脏 CYP450 酶活性的影响

尚芳红<sup>1</sup>, 俸珊<sup>2</sup>, 陈乾<sup>2</sup>, 陈先进<sup>2</sup>, 徐晓玉<sup>2\*</sup>

(1. 重庆市中药研究院, 重庆 400065; 2. 西南大学药学院中医药学院, 重庆 400715)

本研究显示加味佛手散胶囊体外对 CYP450 5 种亚酶具有不同程度的诱导或抑制作用, 是否与合用药物产生相互作用, 可能主要取决于参与药物体内处置的 CYP450 亚型及同工酶水平。

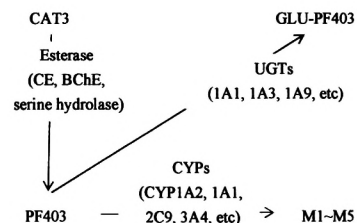


1108

**新型抗脑瘤化合物 CAT3 的体外代谢研究**

赵晟宇, 王汝冰, 白洁, 范小庆, 胡民万, 孙燕红, 扈金萍\*, 李燕  
(中国医学科学院、北京协和医学院药物研究所, 天然药物活性物质与功能国家重点实验室, 创新药物非临床药物代谢及 PK/PD 研究北京市重点实验室, 北京 100050)

CAT3 的生物转化是一个多酶催化的反应过程, 其可经酯酶水解为 PF403; PF403 在 CYPs 催化下进一步生成多个氧化代谢产物, 还可被 UGTs 催化生成II相结合产物 GLU-PF403。

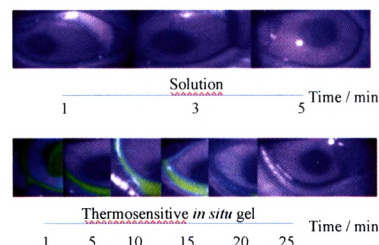


1115

**左卡尼汀温敏原位凝胶的制备及质量评价**

黄平情, 高利利, 于颖超, 王奕博, 吴慧敏, 陈功森, 倪健\*, 曲昌海\*  
(北京中医药大学中药学院, 北京 100029)

经处方优化制备的左卡尼汀温敏原位凝胶眼表给药后迅速由溶液转变成凝胶, 可显著延长药物眼表滞留时间。

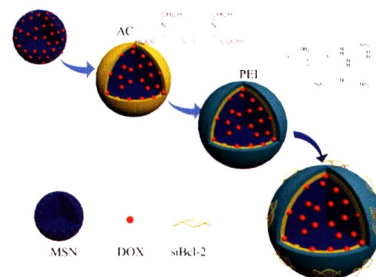


1123

**智能型荧光纳米递送系统用于乳腺癌细胞的示踪和增殖抑制研究**

张贝贝\*, 黄维兰, 梅玉影, 邵悦馨, 张璐, 李瑞芳\*  
(河南工业大学, 河南 郑州 450001)

构建一种智能型荧光纳米载体, 不仅可以实现抗癌药物递送过程的可视化, 而且可以完成癌症细胞的精准杀伤。

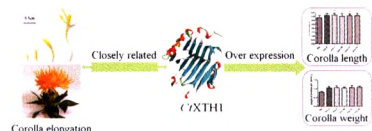


1132

**红花花冠伸长相关基因 *CtXTH1* 的特征与功能研究**

贾鑫磊<sup>1,2</sup>, 何贝轩<sup>2</sup>, 郭丹丹<sup>2</sup>, 高越<sup>2\*</sup>, 郭美丽<sup>1,2\*</sup>  
(1. 福建中医药大学药学院, 福建 福州 350122; 2. 海军军医大学药学院, 上海 200433)

红花 *CtXTH1* 与花冠伸长密切相关, *CtXTH1* 过表达显著增加花冠长度和重量。



**新药发现与研究实例简析**

1141

**突破固有模式的氨氯地平的研发**

郭宗儒  
(中国医学科学院、北京协和医学院药物研究所, 北京 100050)

**信息**

《药学报》英文刊 2019 年第 3 期图文摘要

## Professionals Forum

963

### 2018 DMPK research progress in China

YU Lu-shan<sup>1</sup>, BI Hui-chang<sup>2</sup>, WU Bao-jian<sup>3</sup>, GE Guang-bo<sup>4</sup>, ZHENG Jiang<sup>5,6</sup>, QIAO Hai-ling<sup>7</sup>, ZENG Su<sup>1\*</sup>

(1. College of Pharmaceutical Sciences, Zhejiang University, Hangzhou 310058, China; 2. School of Pharmaceutical Sciences, Sun Yat-sen University, Guangzhou 510006, China; 3. School of Pharmacy, Jinan University, Guangzhou 510632, China; 4. Institute of Interdisciplinary Medicine, Shanghai University of Traditional Chinese Medicine, Shanghai 201203, China; 5. Shenyang Pharmaceutical University, Shenyang 110016, China; 6. School of Pharmacy, Guizhou Medical University, Guiyang 550004, China; 7. Basic Medical College, Zhengzhou University, Zhengzhou 450001, China)

This paper summarizes the important research achievements in the field of DMPK by Chinese scholars in 2018 and looks forward to the future research hotspots in this field.



## Reviews

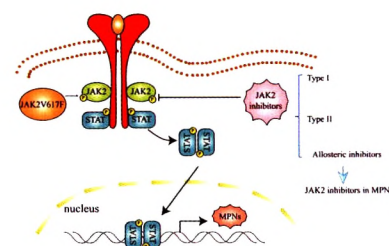
971

### Advances in JAK2 inhibitors for treatment of myeloproliferative neoplasms

HU Min, SHI Gao-na, SHI Jian-gong\*, ZHANG Tian-tai\*

(Institute of Materia Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China)

This review describes the targets of JAK2 in MPNs, the latest progress of the relationship between JAK2 and MPNs, JAK2 inhibitors for the treatment of MPNs.



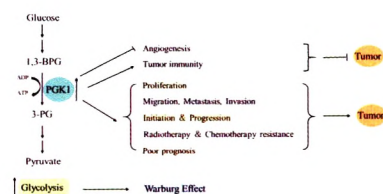
978

### Phosphoglycerate kinase 1 and cancer

WANG Yu-ying<sup>1</sup>, QI Xin<sup>1</sup>, LI Jing<sup>1,2\*</sup>

(1. Key Laboratory of Marine Drugs, Chinese Ministry of Education, School of Medicine and Pharmacy, Ocean University of China, Qingdao 266003, China; 2. Laboratory for Marine Drugs and Bioproducts of Qingdao National Laboratory for Marine Science and Technology, Qingdao 266237, China)

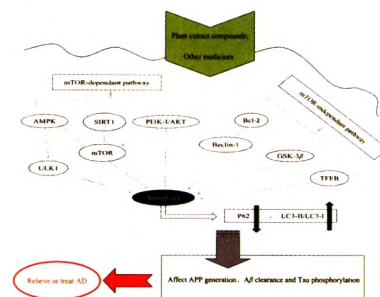
Phosphoglycerate kinase 1 (PGK1) is a key metabolic enzyme in the glycolysis pathway, which is essential for the supply of energy and substrates to cancer cells. Besides, as an oncogenic protein, PGK1 expression is upregulated in many types of human cancer, which promotes the development and progression of tumors and correlates poor survival of cancer patients.



984

**Medications regulate autophagy for treatment of Alzheimer's disease**TAN Cheng-yong<sup>1</sup>, TIAN Hui-zhen<sup>1</sup>, KUANG Huang<sup>1</sup>, HONG Fen-fang<sup>2\*</sup>, YANG Shu-long<sup>1\*</sup>*(1. College of Basic Medicine, Nanchang University, Nanchang 330031, China;**2. Medical Experimental Teaching Center, Nanchang University, Nanchang 330006, China)*

Some plant extract compounds and other drugs that regulate autophagy through various pathways, thereby modulating autophagic substrate levels that affect A $\beta$  and Tau levels *in vivo*, are promising drugs for alleviating or treating Alzheimer's disease.



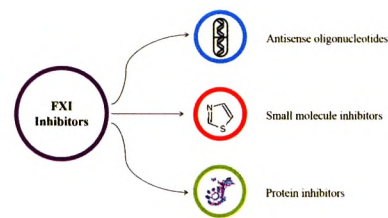
991

**Research progress on the inhibitors against factor XI**

REN Shen-hong, MAO Zi-min, KONG Yi\*

*(School of Life Science and Technology, China Pharmaceutical University, Nanjing 211198, China)*

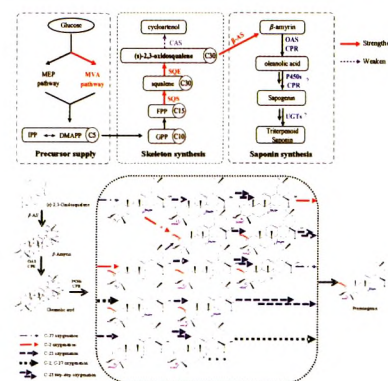
Factor XI (FXI) is a novel anticoagulation target with low risk of bleeding. This paper reviewed the progress of FXI inhibitors, including antisense oligonucleotides inhibitors, small molecular inhibitors and protein inhibitors.



1000

**Advance in biosynthesis of plant-derived oleanane type triterpenoids such as Polygala saponins with catalysis by cytochrome P450s**ZHANG Fu-sheng<sup>1\*</sup>, KONG Ran-ran<sup>1,2</sup>, CHEN Tong-yao<sup>1</sup>, WANG Qian-yu<sup>1,2</sup>, QIN Xue-mei<sup>1</sup>, DU Chen-hui<sup>3</sup>, MA Cun-gen<sup>3\*</sup>*(1. Modern Research Center for Traditional Chinese Medicine, 2. College of Chemistry and Chemical Engineering, Shanxi University, Taiyuan 030006, China; 3. Shanxi University of Chinese Medicine, Taiyuan 030024, China)*

This paper describes the biosynthesis framework of oleanane type triterpene saponins and the possible biosynthetic pathway of the presenegenin.



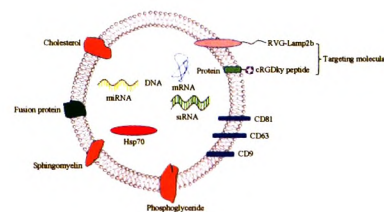
1010

**Advances in research on exosomes as drug delivery vehicles**

ZHANG Ying-ying, CHEN Li-qing, LIU Xuan, XIN Xin, MENG Ling-wei, JIN Ming-ji, GAO Zhong-gao, HUANG Wei\*

*(State Key Laboratory of Bioactive Substance and Function of Natural Medicines, Institute of Materia Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China)*

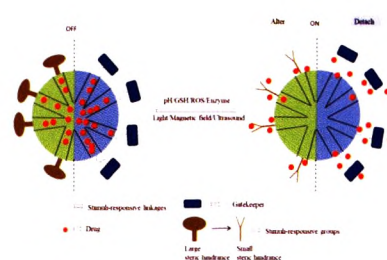
Exosomes which are natural endogenous nanocarriers with high biocompatibility will play a significant role in the process of drug delivery.



1017

**Research progress of drug delivery system with "gatekeeper"**ZHANG Jia<sup>1</sup>, ZHAO Ting<sup>1</sup>, DUN Jie-ning<sup>1</sup>, SUN Ming-xian<sup>1</sup>, HUANG Rong-rong<sup>1</sup>, XIANG Bai<sup>1\*</sup>, BAI Jing<sup>2\*</sup>, CAO De-ying<sup>1</sup>*(1. School of Pharmacy, Hebei Medical University, Shijiazhuang 050017, China;**2. Department of Pharmacy, the Fourth Hospital of Hebei Medical University, Shijiazhuang 050011, China)*

The drug delivery system with "gatekeeper" is designed to achieve a stable entrapment state of the drug under normal physiological conditions through the gatekeepers. With tumor microenvironment or stimulation of exogenous factors, the gatekeeper is detached or altered to promote the responsive release of the drug.





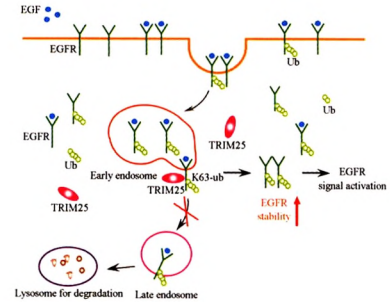
Original Articles

1026

**TRIM25 enhances EGFR stability and signaling activity to promote lung cancer progression**

ZHOU Dan-dan, YU Jiao-jiao, HU Zhuo-wei, HUA Fang  
*(State Key Laboratory of Bioactive Substance and Function of Natural Medicines, Beijing Key Laboratory of New Drug Mechanisms and Pharmacological Evaluation Study (BZ0150), Institute of Meteria Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China)*

TRIM25 inhibits the degradation of EGFR through promoting K63-linked ubiquitination of EGFR, thereby increasing the expression level of EGFR and activates its downstream signaling activity.

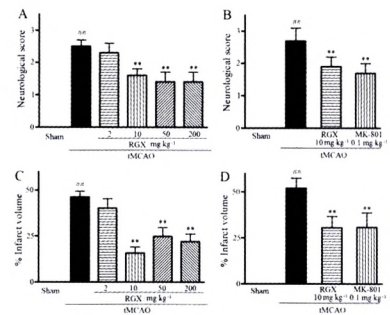


1036

**Therapeutic effects of artificial musk on acute ischemic stroke and subarachnoid hemorrhage in rats**

WANG Ling<sup>1</sup>, LI Jiang<sup>1</sup>, XU Shao-feng<sup>1</sup>, FENG Nan<sup>1</sup>, ZHANG Shu<sup>2</sup>, WANG Xiao-liang<sup>1\*</sup>  
*(1. Institute of Materia Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, State Key Laboratory of Natural Products and Functions, Beijing 100050, China; 2. Beijing Lianxin Pharmaceutical Co., Ltd., Beijing 102628, China)*

Oral administration of artificial musk can significantly improve neurobehavioral scores and cerebral infarct volume in ischemia-reperfused rats. The effective dose of artificial musk is 10 mg·kg<sup>-1</sup> in ischemic stroke and 200 mg·kg<sup>-1</sup> in hemorrhagic stroke.

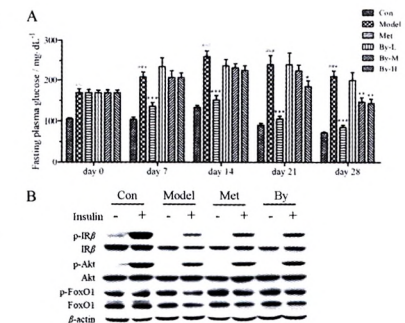


1041

**Experimental study of bicyclol for type 2 diabetic treatment using KKAY mice**

WANG Ya-nan, ZHANG Xiao-lin, YIN Zhen, TIAN Jin-ying, LI Xue-chen, YE Fei<sup>\*</sup>  
*(Beijing Key Laboratory of New Drug Mechanisms and Pharmacological Evaluation Study, Institute of Materia Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China)*

Bicyclol can suppress the high level of fasting blood glucose by improving hepatic insulin resistance in T2DM mice.

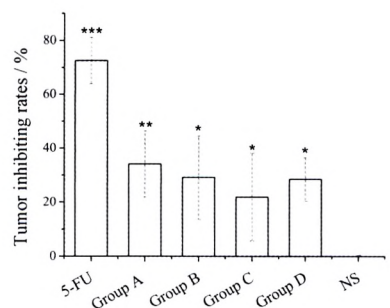


1048

**Effect on tumor growth inhibition activity of *Gekkoswinhonis Guenther* with different extent of broiling on H22 tumor-bearing mice**

CHEN Xin-yi, LIU Jian-ting, DENG Hong-mei, WANG Chun-mei<sup>\*</sup>  
*(School of Life Science, Beijing University of Chinese Medicine, Beijing 100029, China)*

The best drying and broiling method for lizards based on tumor growth inhibition activity on H<sub>22</sub> tumor-bearing mice model was drying at 60°C without broiling.

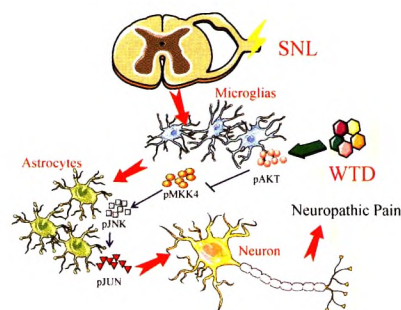


1054

**Investigation on the inflammation network mechanisms of Wutou decoction acting on neuropathic pain**

GUO Qiu-yan<sup>#</sup>, LI Wei-jie<sup>#</sup>, WANG Chao, CAO Ren-li, LI Tai-xian, MAO Xia, WANG Xiao-yue, GUO Min-qun, ZHANG Yan-qiong<sup>\*</sup>, LIN Na<sup>\*</sup>  
(Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, Beijing 100700, China)

Wutou decoction exerted analgesic effect by regulating the phosphorylated proteins' expression levels of AKT-MK4-JNK-JUN signal pathway.

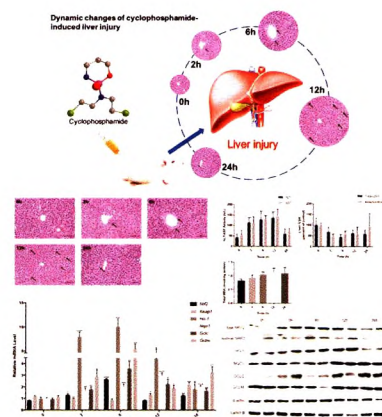


1062

**Dynamic changes of cyclophosphamide-induced liver injury in mice**

HUANG Can, HE Fa-jing, YANG Xiao, GUAN Li-huan, ZHANG Si-min, ZHOU Yan-ying, FAN Shi-cheng, YAO Xin-peng, HUANG Min<sup>\*</sup>, BI Hui-chang<sup>\*</sup>  
(Lab of Drug Metabolism and Pharmacokinetics, School of Pharmaceutical Sciences, Guangzhou 510006, China)

In a summary, this study demonstrate the dynamic change of CPA-induced liver injury and the NRF2-mediated protective mechanisms, providing new insights into the CPA-induced liver injury.

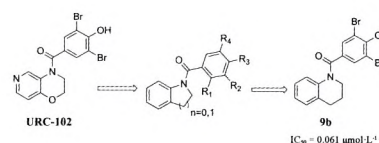


1069

**Design, synthesis and biological evaluation of inhibitors of urate transporter 1 (URAT1)**

WANG Yong-cheng, YANG Ya-jun, HOU Xian-xin, YANG Ying, XIAO Zhi-yan<sup>\*</sup>  
(Beijing Key Laboratory of Active Substance Discovery and Druggability Evaluation, Institute of Materia Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China)

Fourteen new compounds were designed and synthesized based on URC-102. The most active compound **9b** showed an IC<sub>50</sub> value of 0.061 μmol·L<sup>-1</sup> against hURAT1.

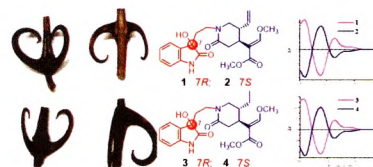


1075

**Alkaloids from an aqueous extract of *Uncaria rhynchophylla***

CAI Jian, GUO Qing-lan, LI Ruo-fei, WANG Yue, XU Cheng-bo, ZHU Cheng-gen, YANG Yong-chun, SHI Jian-gong<sup>\*</sup>  
(Key Laboratory of Bioactive Substance and Function of Natural Medicines, Institute of Materia Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China)

Alkaloids **1-4** were isolated from a decoction of *Uncaria rhynchophylla*. Among them, **1** and **2** are new compounds, and **3** and **4** are new natural products which were previously semi-synthesized from rhynchohylline and isorhynchohylline and reported with absolute configurations but incorrect specific rotations.

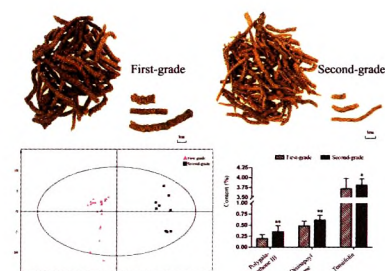


1082

**Quality analysis of different grades of *Glycyrrhiza Polygalae Radix* slices**

JIANG Yu-tong<sup>1</sup>, GAO Zhao<sup>1</sup>, LE Zhi-yong<sup>2</sup>, BAI Zong-li<sup>2</sup>, TU Peng-fei<sup>1</sup>, JIANG Yong<sup>1\*</sup>  
(1. State Key Laboratory of Natural and Biomimetic Drugs, School of Pharmaceutical Sciences, Peking University, Beijing 100191, China; 2. Kangmei Pharmaceutical Co., Ltd., Puning 515300, China)

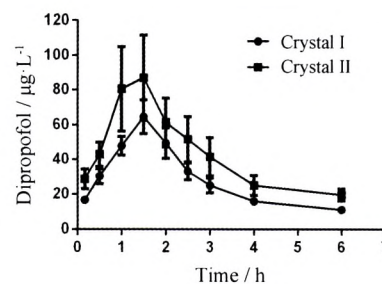
The grading and quality analysis methods for different commercial *Glycyrrhiza Polygalae Radix* slices were established, and the qualities of different grade samples were analyzed and compared.



1088

**Pharmacokinetics of two types of dipropofol crystal tablets in Beagle dogs**  
 GUO Shu-pan<sup>1\*</sup>, WANG Ru-tao<sup>1</sup>, ZHAO Yi<sup>1</sup>, AN Long<sup>1</sup>, XIAO Sa<sup>1</sup>, QIN Yan<sup>2</sup>  
 (1. Xi'an Libang Zhaoxin Biological Technology Co., Ltd, Xi'an 710077, China;  
 2. Shanghai Institute of Pharmaceutical Industry, Shanghai 200437, China)

Preparation and pharmacokinetics of two kinds of dipropofol crystal tablets in beagle dogs.

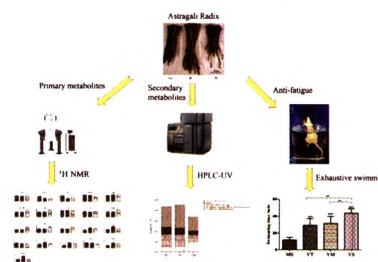


1092

**Examination of the correlation between grades, chemical characteristics and anti-fatigue effect of Astragali Radix**

ZHANG Rui<sup>1,2,3,4</sup>, CAO Qing-wei<sup>1,2,3,4</sup>, LI Ke<sup>1,3,4\*</sup>, QIN Xue-mei<sup>1,3,4\*</sup>  
 (1. Modern Research Center for Traditional Chinese Medicine; 2. College of Chemistry and Chemical Engineering; 3. Key Laboratory of Effective Substances Research and Utilization in TCM of Shanxi Province; 4. Key Laboratory of Chemical Biology and Molecular Engineering of Ministry of Education, Shanxi University, Taiyuan 030006, China)

Analysis of the correlation between grades and chemical characteristics and anti-fatigue effects of Astragali Radix.

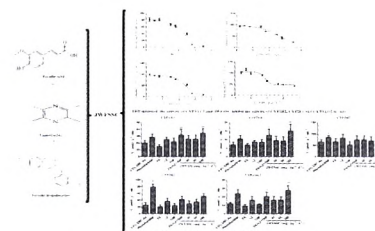


1101

**Effects of Jiawei Foshou San capsule on rat hepatic cytochrome P450 enzymes *in vitro* and *in vivo***

SHANG Fang-hong<sup>1</sup>, FENG Shan<sup>2</sup>, CHEN Qian<sup>2</sup>, CHEN Xian-jin<sup>2</sup>, XU Xiao-yu<sup>2\*</sup>  
 (1. Chongqing Academy of Chinese Materia Medica, Chongqing 400065, China;  
 2. College of Pharmaceutical Sciences and Chinese Medicine, Southwest University, Chongqing 400715, China)

The present study suggested that Jiawei Foshou San capsule inhibited or induced five rat liver microsomal CYP450 isozymes to a certain extent respectively *in vivo* and *in vitro*, and the interaction between Jiawei Foshou San capsule and coadministrative drugs depends on the levels and subtype of CYP450 involved in the drug metabolism.

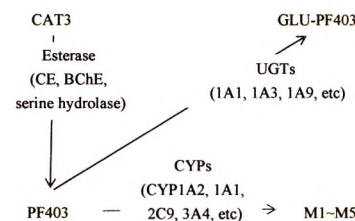


1108

**Metabolism of a promising anti-tumor agent CAT3 *in vitro***

ZHAO Sheng-yu, WANG Ru-bing, BAI Jie, FAN Xiao-qing, HU Min-wan, SUN Yan-hong, HU Jin-ping\*, LI Yan  
 (State Key Laboratory of Bioactive Substance and Function of Natural Medicines, Beijing Key Laboratory of Non-Clinical Drug Metabolism and PK/PD Study, Institute of Materia Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China)

The metabolism of CAT3 was a multiple enzymes catalytic reaction. CAT3 could be hydrolyzed to PF403 by esterase. PF403 was further transformed to several oxidative metabolites via CYPs, or was catalyzed by UGTs into phase II conjugated product GLU-PF403.

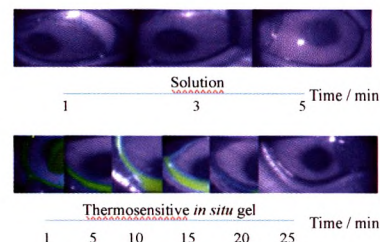


1115

**Preparation and quality evaluation of levocarnitine thermosensitive *in situ* gel**

HUANG Ping-qing, GAO Li-li, YU Ying-chao, WANG Yi-bo, WU Hui-min, CHEN Gong-sen, NI Jian\*, QU Chang-hai\*  
 (School of Chinese Materia Medica, Beijing University of Chinese Medicine, Beijing 100029, China)

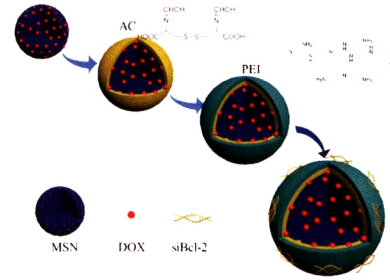
After administration, the optimal prescription of the levocarnitine thermosensitive *in situ* gel is rapidly convert from solution to gel on the ocular surface, which can significantly prolong the ocular surface retention time of the drug.



1123

**Smart fluorescent nano-delivery system for breast cancer cell tracing and growth inhibition**ZHANG Bei-bei\*, HUANG Wei-lan, MEI Yu-ying, SHAO Yue-xin,  
ZHANG Lu, LI Rui-fang\**(Henan University of Technology, Zhengzhou 450001, China)*

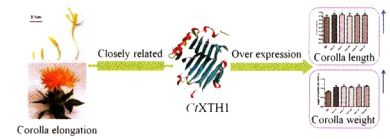
The construction of an intelligent fluorescent nanocarrier can not only visualize the anticancer drug delivery process, but also complete the precise killing of cancer cells.



1132

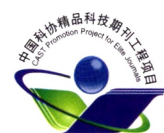
**The characteristics and functions of *CtXTH1*: the gene boosts the corolla elongation in safflower**JIA Xin-lei<sup>1,2</sup>, HE Bei-xuan<sup>2</sup>, GUO Dan-dan<sup>2</sup>, GAO Yue<sup>2\*</sup>, GUO Mei-li<sup>1,2\*</sup>*(1. Pharmacy College, Fujian University of Traditional Chinese Medicine, Fuzhou 350122, China; 2. Pharmacy College, Second Military Medical University, Shanghai 200433, China)*

*CtXTH1* closely related to corolla elongation in safflower. Over expression of *CtXTH1* significantly increased the corolla length and weight.



# ACTA PHARMACEUTICA SINICA

Volume 54 Number 6 2019 June



期刊基本参数: CN 11-2163/R\*1953\*m\*A4\*182\*zh\*P\* ¥40.00\* \*24\*2019-06

本期责任编辑 岳 瑞

药 学 学 报 (YAOXUE XUEBAO)

(月刊, 1953年7月创刊)

主管单位: 中国科学技术协会

主办单位: 中国药学会 (<http://www.cpa.org.cn>)

中国医学科学院药物研究所  
(<http://www.imm.ac.cn>)

编辑出版: 药学报编辑部 (100050 北京市先农坛街1号)

电话/传真: 86-10-63026192, 63035012;

电子信箱: [yxxb@imm.ac.cn](mailto:yxxb@imm.ac.cn);

网址: <http://www.yxxb.com.cn>

主编: 王晓良

印刷: 北京科信印刷有限公司

国内订购: 全国各地邮电局

发行范围: 公开发行

国内: 北京报刊发行局

国外: 中国国际图书贸易集团有限公司  
(北京市399信箱, 100044)

ACTA PHARMACEUTICA SINICA

(Monthly, Founded in 1953 July)

Directed by: China Association for Science and Technology

Sponsored by: Chinese Pharmaceutical Association

(<http://www.cpa.org.cn>)

Institute of Materia Medica, Chinese Academy of Medical  
Sciences (<http://www.imm.ac.cn>)

Edited and Published by: Editorial Office of Acta Pharmaceutica Sinica

(1 Xiannongtan Street, Beijing 100050).

Tel / Fax: 86-10-63026192, 63035012;

E-mail: [yxxb@imm.ac.cn](mailto:yxxb@imm.ac.cn); <http://www.yxxb.com.cn>

Editor-in-chief: WANG Xiao-liang

Printed by: Beijing Kexin Printing Co., Ltd.

Domestic subscriptions: Local Post Offices

Distribution

Domestic: Beijing Post Offices

Foreign: China International Book Trading Corporation,  
PO Box 399, Beijing 100044, China

ISSN 0513-4870

2019年 第54卷 第6期

2019年6月12日出版

邮发代号: 2-233

CN 11-2163/R

2019, Vol. 54, No.6

Publication Date: 2019-06-12

Code number: M105

国内定价: 每期40.00元



ISSN 0513-4870

