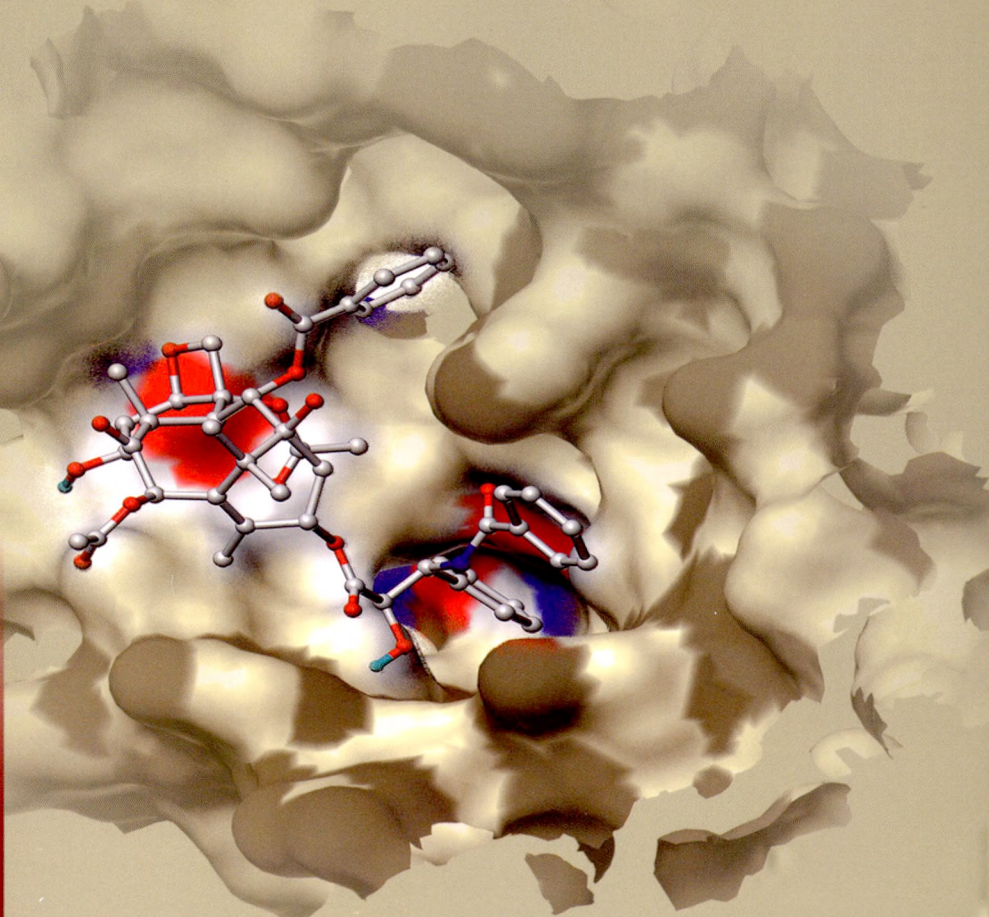


# 药 学 学 报

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# Acta Pharmaceutica Sinica

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促进急性淋巴细胞白血病疾病进程



中国药学会  
中国医学科学院药物研究所

# 药 学 学 报

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### 综 述

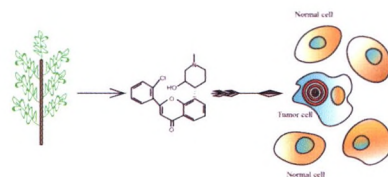
2491

#### 源于天然产物或其衍生物的分子靶向抗肿瘤药物研究进展

张旭, 蒙凌华\*

(中国科学院上海药物研究所, 上海 201203)

天然产物作为药物来源的重要宝库, 在分子靶向抗肿瘤药物的发现、研究与开发中发挥着不可替代的作用。



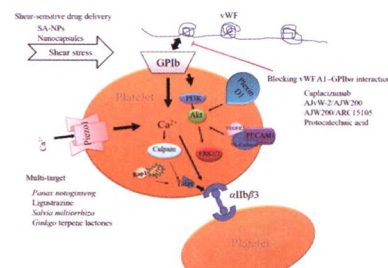
2501

#### 剪切诱导血小板聚集机制及其治疗进展

刘蕾, 游云\*, 廖福龙

(中国中医科学院中药研究所, 北京 100700)

本文叙述了近年来剪切诱导血小板聚集可能的机制, 总结了现有化合物及传统中药抗剪切诱导血小板聚集的效应机制。



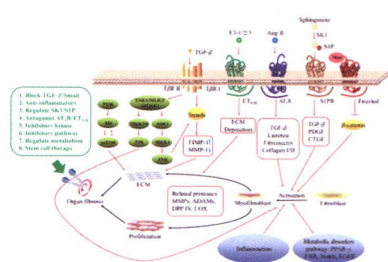
2510

#### 抗器官纤维化药物研究进展

任强, 张陆勇\*, 李政\*

(广东药科大学药学院, 广东 广州 510006)

本文分别综述了器官纤维化的治疗策略和抗器官纤维化药物的研究进展, 为抗器官纤维化药物的研发提供参考。



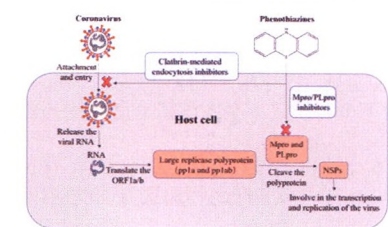
2529

#### 吩噻嗪类化合物潜在抗冠状病毒活性的研究进展

万君玥<sup>1</sup>, 陈华<sup>2\*</sup>, 尹婕<sup>2</sup>

(1. 中国药科大学, 江苏 南京 210000; 2. 中国食品药品检定研究院, 化学药品质量研究与评价重点实验室, 北京 100050)

抗精神病吩噻嗪类药物的潜在抗冠状病毒活性的作用机制及其老药新用的开发应用前景。



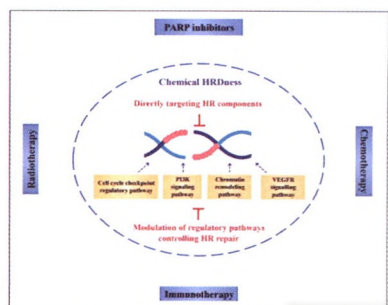
2535

#### 靶向同源重组修复的抗肿瘤研究进展

钟振兴<sup>1</sup>, 彭鑫<sup>1,2</sup>, 孔德新<sup>1\*</sup>

(1. 天津医科大学药学院, 天津 300070; 2. Department of Systems Biology, the University of Texas MD Anderson Cancer Center, Houston, TX 77030, USA)

利用分子靶向药物直接抑制同源重组修复通路的关键组分或靶向其调节通路可造成同源重组修复缺陷 (homologous recombination deficiency, HRDness) 的表型, 与 PARP 抑制剂联用可在同源重组修复功能正常的肿瘤中造成“合成致死”, 也可与传统的放化疗和新兴的免疫疗法发挥协同抗肿瘤作用。



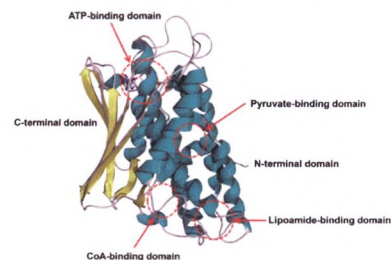
2549

**丙酮酸脱氢酶抑制剂的研究进展**

张作鹏, 仲焯, 程卯生, 刘洋\*

(沈阳药科大学基于靶点的药物设计与研究教育部重点实验室, 辽宁 沈阳 110016)

本文依据丙酮酸结合位点、辅酶 A 结合位点、脂酰胺结合位点及 ATP 结合位点等不同抑制剂作用位点分类, 对已报道的丙酮酸脱氢酶抑制剂的研究进展进行介绍。



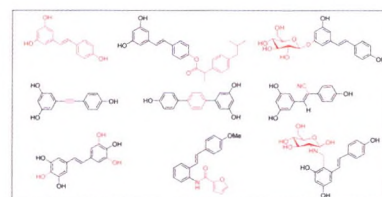
2558

**白藜芦醇的结构修饰与生物活性研究进展**

韩丽, 李鸿鹏, 李文玲\*

(兰州交通大学化学与生物工程学院, 甘肃 兰州 730070)

本文综述了近 10 年来白藜芦醇的结构修饰、其类似物和衍生物的化学合成、生物活性以及药理作用, 并展望了此类化合物的未来发展和应用。



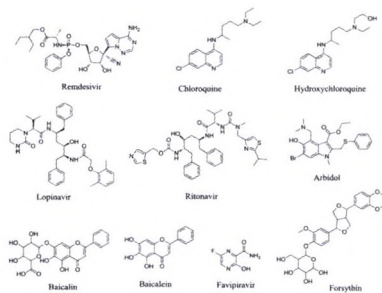
2570

**抗新型冠状病毒肺炎 (COVID-19) 药物的代谢和药动学**

潘露露, 钟大放\*

(中国科学院上海药物研究所, 上海 201203)

本文以我国新型冠状病毒肺炎诊疗方案 (试行第七版) 推荐的抗病毒治疗的药物为基础, 对临床上用于治疗 COVID-19 的药物包括瑞德西韦、氯喹和羟氯喹、洛匹那韦/利托那韦、法匹拉韦、阿比朵尔、黄芩苷和连花清瘟胶囊主要成分连翘苷进行了药物代谢和药动学性质的综述。



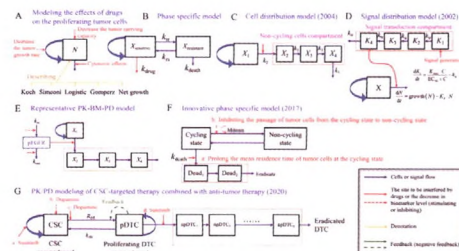
2580

**基于异植瘤小鼠的抗肿瘤药 PK/PD 模型: 历史回顾、研究进展与应用实践**

胡宽, 花开, 杨劲\*

(中国药科大学药学院药物代谢研究中心, 江苏 南京 210009)

系统地回顾了主流抗肿瘤药 PK/PD 模型的诞生背景、适用范围与应用局限。详细综述了创新抗肿瘤药 PK/PD 模型研究进展, 并从作用机制探索、联合用药优化以及临床转化预测方面列举了 PK/PD 模型在抗肿瘤药物研究中的应用实践。



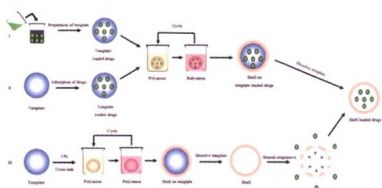
2595

**逐层自组装技术在药物递送中的研究进展**

邸金威, 杜祎萌, 高翔, 张慧, 刘楠, 郑爱萍\*, 高静\*

(军事科学院军事医学研究院毒物药物研究所, 北京 100850)

本文综述了采用逐层自组装技术 (LbL) 制备的薄膜作为药物载体的研究进展, 介绍了 LbL 技术及其在药物递送方面的应用。

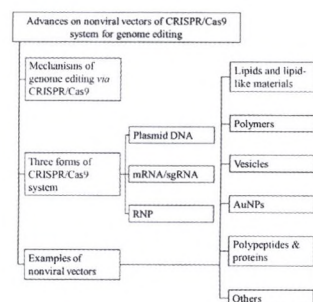


2606

**非病毒载体递送 CRISPR/Cas9 系统的研究进展**王钰<sup>1</sup>, 黄归<sup>1</sup>, 杨茵<sup>2</sup>, 张学农<sup>1\*</sup>

(1. 苏州大学药学院, 江苏 苏州 215123; 2. 江苏海岸药业有限公司, 江苏 苏州 215215)

本文对 CRISPR/Cas9 的作用机制、基因编辑实现方式、3 种方式面临的困难及应对策略, 以及非病毒载体的研究进展进行了总结。



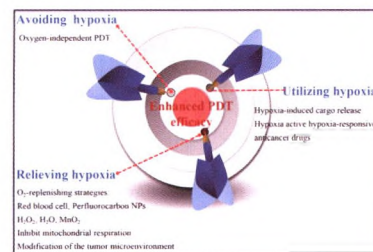
2618

**基于肿瘤乏氧增效光动力治疗的研究进展**

尹小杰, 王晓倩, 张凤玲\*

(浙江中医药大学药学院, 浙江 杭州 310053)

本文简述了近年来各种减缓、利用和避免肿瘤乏氧, 提高光动力治疗效果的策略。



**研究论文**

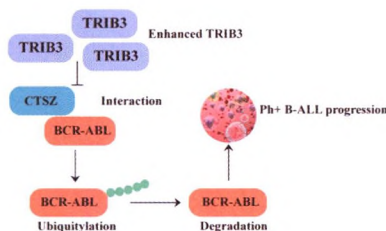
2628

**TRIB3 通过抑制 CTSZ 介导的 BCR-ABL 降解促进急性淋巴细胞白血病疾病进程**

再吾力·叶尔江<sup>1</sup>, 王凤<sup>1</sup>, 杨兆娜<sup>1</sup>, 胡卓伟<sup>1</sup>, 李珂<sup>2\*</sup>

(1. 中国医学科学院、北京协和医学院药物研究所, 北京 100050; 2. 中国医学科学院、北京协和医学院医药生物技术研究所, 北京 100050)

TRIB3 通过与 CTSZ 相互作用, 抑制 CTSZ 介导的 BCR-ABL 降解来促进急性淋巴细胞白血病疾病进程。



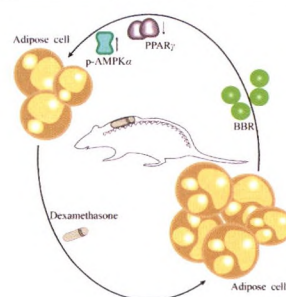
2636

**小檗碱对地塞米松所致 C57 小鼠糖脂代谢紊乱的改善作用**

马晓蕾<sup>1</sup>, 蒋卫<sup>2</sup>, 樊伟明<sup>2</sup>, 傅小峰<sup>2</sup>, 王璐璐<sup>1\*</sup>, 蒋建东<sup>1</sup>

(1. 中国医学科学院、北京协和医学院药物研究所, 北京 100050; 2. 浙江省震元制药研究院, 浙江 绍兴 312071)

通过 3T3-L1 细胞分化模型及地塞米松渗透泵小鼠模型, 证明小檗碱可通过调节 PPAR $\gamma$  及 p-AMPK $\alpha$  表达来改善糖皮质激素类药物所引起的代谢紊乱及内脏脂肪堆积, 有望对糖皮质激素的临床不良反应治疗提供参考。



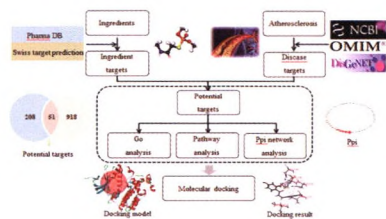
2642

**基于网络药理学与分子对接技术研究黄精抗动脉粥样硬化的作用机制**

高凤凤<sup>1</sup>, 裴艳玲<sup>2</sup>, 任越<sup>1</sup>, 陈紫军<sup>1</sup>, 卢建秋<sup>1\*</sup>, 张燕玲<sup>1\*</sup>

(1. 北京中医药大学中药学院, 北京 100102; 2. 河北鑫民和质检技术服务有限公司, 河北 安国 071200)

本研究采用网络药理学研究策略, 探讨黄精治疗 AS 多成分、多靶点和多通路的作用特征, 阐释黄精抗 AS 的作用机制, 为其进一步研究奠定基础。



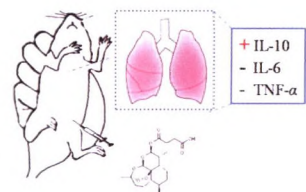
2651

**青蒿琥酯对小鼠巨细胞病毒性肺炎的治疗作用**

王萍, 陈盛, 黄小桃, 肖小梅, 湛青平, 秦爱萍\*, 余细勇\*

(广州医科大学药学院, 广东省分子靶标与临床药理学重点实验室, 呼吸疾病国家重点实验室药理学组, 广东 广州 511436)

青蒿琥酯通过抑制炎症因子 TNF- $\alpha$  和 IL-6, 上调抗炎因子 IL-10 表达, 减轻小鼠巨细胞病毒 (MCMV) 感染引起的小鼠肺部炎症。



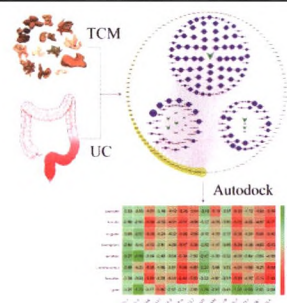
2657

**基于网络药理学探讨李氏溃结方治疗溃疡性结肠炎的分子机制**

田瑞<sup>1</sup>, 李宇飞<sup>2</sup>, 李莹倩<sup>2</sup>, 郑继雯<sup>1</sup>, 李华山<sup>2\*</sup>

(1. 北京中医药大学, 北京 100029; 2. 中国中医科学院广安门医院, 北京 100053)

本文通过网络药理学及分子对接探讨李氏溃结方治疗溃疡性结肠炎的分子机制。



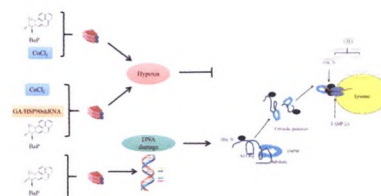
2665

### 苯并芘在模拟缺氧环境下对分子伴侣自噬影响的分子机制

杨帆<sup>1</sup>, 林楠<sup>1</sup>, 张莎莎<sup>1</sup>, 张梦迪<sup>1,3</sup>, 胡玉霞<sup>2,3</sup>, 白图雅<sup>1,3</sup>, 吕晓丽<sup>1,3</sup>, 李君<sup>2,3</sup>, 肖志彬<sup>1,3</sup>, 奥敦托娅<sup>4</sup>, 常福厚<sup>1,2,3\*</sup>

(1. 内蒙古医科大学药学院, 内蒙古自治区 呼和浩特 010110; 2. 内蒙古医科大学新药安全评价中心, 内蒙古自治区 呼和浩特 010110; 3. 内蒙古自治区新药筛选工程研究中心, 内蒙古自治区 呼和浩特 010110; 4. 内蒙古医科大学附属医院, 内蒙古自治区 呼和浩特 010110)

BaP 在缺氧环境下对 CMA 有抑制作用, HSP90 被抑制或沉默将增强 BaP 对 CMA 的抑制作用。在常氧环境下, BaP 导致 DNA 损伤促进 CMA。



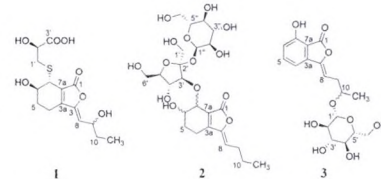
2674

### 川芎中三个新的丁基苯酞类化合物

苑祥, 韩冰, 冯子明, 姜建双, 杨桢楠, 张培成\*

(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)

本实验从川芎乙醇提取物的正丁醇部位分离得到 3 个丁基苯酞类新化合物。



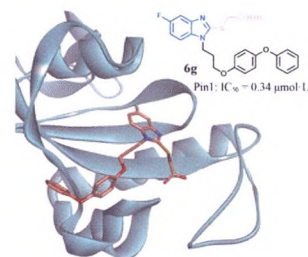
2679

### 肽脯氨酸顺反异构酶 Pin1 抑制剂的设计、合成及活性研究

李坤<sup>1</sup>, 牛群<sup>2</sup>, 徐祺皓<sup>2</sup>, 韩宇<sup>2</sup>, 刘丹<sup>2</sup>, 赵临襄<sup>2\*</sup>

(1. 河南省人民医院药学部, 郑州大学人民医院, 河南大学临床医学院, 河南 郑州 450003; 2. 沈阳药科大学基于靶点的药物设计与研究教育部重点实验室, 辽宁 沈阳 110016)

本文基于 Pin1 蛋白的晶体结构设计合成一系列 2-(1*H*-苯并咪唑-2-基硫) 乙酸类衍生物, 其中化合物 **6g** 具有较强的酶抑制活性, IC<sub>50</sub> 值为 0.34 μmol·L<sup>-1</sup>。构效关系和分子对接研究表明苯并咪唑 N1 位的疏水性侧链以及 C2 位的硫代乙酸片段是该类化合物发挥 Pin1 抑制作用的关键。



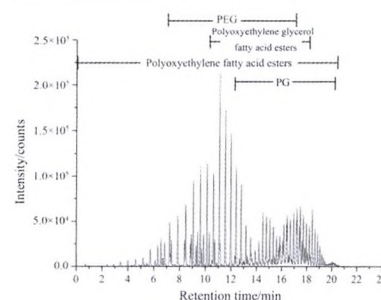
2688

### 聚氧乙烯 35 蓖麻油的 UPCC-Q-TOF-MS 成分分析与安全性初探

李婷<sup>1#</sup>, 王珏<sup>1#</sup>, 袁铭<sup>2</sup>, 孙会敏<sup>1\*</sup>

(1. 国家药品监督管理局药用辅料质量研究与评价重点实验室, 中国食品药品检定研究院, 北京 100050; 2. 沃特世科技有限公司, 上海 201206)

建立 UPCC-Q-TOF-MS 法分析聚氧乙烯 35 蓖麻油成分, 并通过 L-02 细胞毒性和 RBL-2H3 细胞组胺释放对样品进行安全性初探。



2695

### 中成药中重金属及有害元素残留分析、风险评估和限量制定建议

聂黎行<sup>1#</sup>, 钱秀玉<sup>1#</sup>, 蒋沁悦<sup>2</sup>, 李翔<sup>3\*</sup>, 李静<sup>1</sup>, 左甜甜<sup>1</sup>, 常艳<sup>1</sup>, 金红宇<sup>1</sup>, 戴忠<sup>1</sup>, 马双成<sup>1\*</sup>

(1. 中国食品药品检定研究院, 北京 100050; 2. 北京中医药大学, 北京 100029; 3. 解放军总医院医学保障中心, 北京 100048)

基于 2010~2018 年国家药品抽检大数据, 分析中成药中铅、镉、砷、汞、铜、铬的残留特征, 明确其风险评估的基本步骤、计算公式和具体参数, 提出了最大限量的建议制定方法和计算公式。



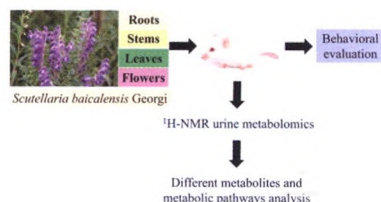
2702

### 基于 <sup>1</sup>H NMR 尿液代谢组学的黄芩不同生长部位抗衰老作用研究

李萌茹<sup>1</sup>, 周玉枝<sup>1\*</sup>, 柴建新<sup>2</sup>, 陈强<sup>2</sup>, 高丽<sup>1</sup>, 杜冠华<sup>1,3</sup>, 秦雪梅<sup>1</sup>

(1. 山西大学中医药现代研究中心, 山西 太原 030006; 2. 山西振东制药股份有限公司, 山西 长治 047100; 3. 中国医学科学院、北京协和医学院药物研究所, 北京 100050)

基于 <sup>1</sup>H NMR 尿液代谢组学阐释黄芩不同生长部位醇提物对 D-半乳糖诱导的衰老大鼠的改善作用。



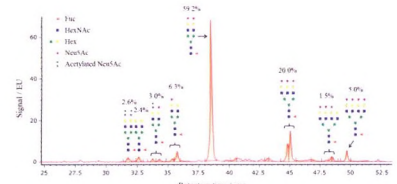
2713

液质联用分析重组人尿激酶原的糖基修饰异质性

陶磊<sup>#</sup>, 于雷<sup>#</sup>, 丁有学, 毕华<sup>\*</sup>, 饶春明<sup>\*</sup>

(中国食品药品检定研究院, 卫生部生物技术产品检定方法及其标准化重点实验室, 北京 100050)

糖基化修饰位点及糖型的不均一性导致了重组人 pro-UK 的异质性, 对其质量控制提出了挑战。



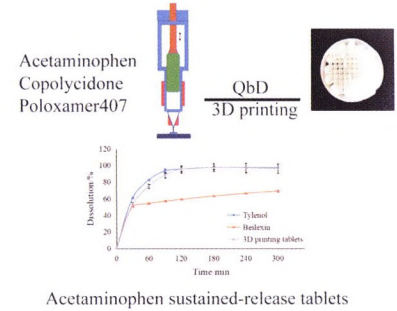
2719

“质量源于设计”在 3D 打印法制备对乙酰氨基酚缓释片中的应用

刘伯石<sup>1,2</sup>, 王增明<sup>1</sup>, 张慧<sup>1</sup>, 高静<sup>1</sup>, 刘楠<sup>1</sup>, 高翔<sup>1</sup>, 李蒙<sup>1</sup>, 郑爱萍<sup>1\*</sup>

(1. 军事科学院军事医学研究院毒物药物研究所, 北京 100850; 2. 中国人民解放军 93152 部队医院, 吉林 通化 134000)

以质量源于设计 (QbD) 理念指导对乙酰氨基酚缓释片的制备, 证明 3D 打印制药技术较普通制剂方法具有明显的灵活性。



Acetaminophen sustained-release tablets

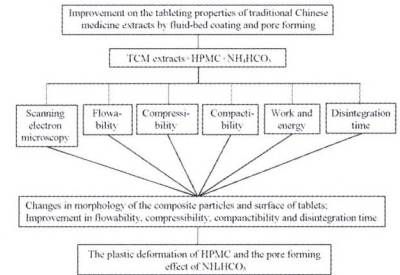
2728

流化包裹与致孔对中药提取物片剂制备性质的改善

罗毓<sup>1</sup>, 吴飞<sup>2</sup>, 沈岚<sup>1</sup>, 林晓<sup>1\*</sup>, 冯怡<sup>2</sup>

(1. 上海中医药大学中药学院, 上海 201203; 2. 上海中医药大学中药现代制剂技术教育部工程研究中心, 上海 201203)

以羟丙甲基纤维素 (HPMC) 为包裹剂、碳酸氢铵为致孔剂, 二者结合使用能够显著改善中药粉体压片性能并具有一定适用性。



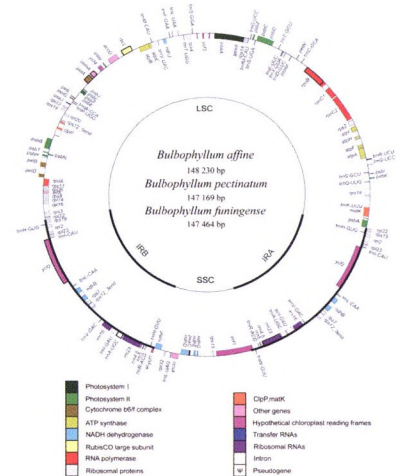
2736

三种石豆兰属药用植物的叶绿体基因组比较分析及其在物种鉴定中的意义

杨嘉鹏<sup>1,2</sup>, 朱紫乐<sup>1</sup>, 范雅娟<sup>1,2</sup>, 朱菲<sup>1,2</sup>, 陈粤珺<sup>1</sup>, 牛志韬<sup>1,2\*</sup>, 丁小余<sup>1,2\*</sup>

(1. 南京师范大学生命科学学院, 江苏 南京 210023; 2. 南京师范大学江苏省石斛兰产业化技术工程中心, 江苏 南京 210023)

本文对三种石豆兰属药用植物 (赤唇石豆兰、长足石豆兰、富宁卷瓣兰) 的叶绿体基因组进行了测序分析; 系统发育研究表明其与石斛属亲缘关系最近; 基于比较叶绿体基因组学方法共筛选出 5 个可用于石豆兰属药用植物鉴定的高变序列。



新药发现与研究实例简析

2746

囊性纤维化治疗药依伐卡托的研制

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)

# ACTA PHARMACEUTICA SINICA

Volume 55 Number 11 2020 November

## Graphical Abstracts

### Reviews

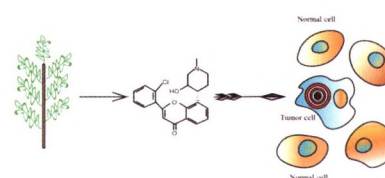
2491

#### Progress in molecularly targeted anti-tumor drugs derived from natural products or their derivatives

ZHANG Xu, MENG Ling-hua\*

(Shanghai Institute of Materia Medica, Chinese Academy of Sciences, Shanghai 201203, China)

As one of the important sources of drugs, natural products play an irreplaceable role in the discovery, research, and development of molecularly targeted anti-tumor drugs.



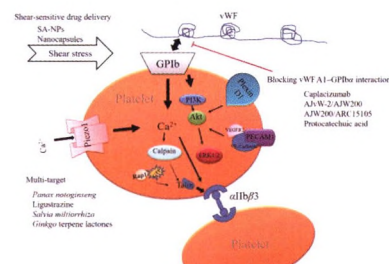
2501

#### On shear-induced platelet aggregation and its therapy

LIU Lei, YOU Yun\*, LIAO Fu-long

(Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, Beijing 100700, China)

This review describes the underlying mechanisms of shear-induced platelet activation, and summarizes the effects and mechanisms of compounds and traditional Chinese medicine on shear-induced platelet activation.



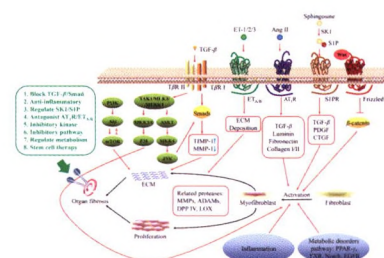
2510

#### Advances in the research of anti-organ fibrosis drugs

REN Qiang, ZHANG Lu-yong\*, LI Zheng\*

(School of Pharmacy, Guangdong Pharmaceutical University, Guangzhou 510006, China)

In the review, the treatment strategies for organ fibrosis and the latest developments in the research of anti-organ fibrosis drugs are summarized to provide a reference for the development of anti-organ fibrosis drugs.



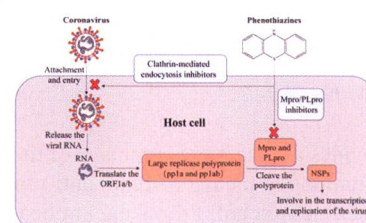
2529

#### Progress and perspective of potential anti-coronavirus activity of phenothiazines

WAN Jun-yue<sup>1</sup>, CHEN Hua<sup>2\*</sup>, YIN Jie<sup>2</sup>

(1. China Pharmaceutical University, Nanjing 210000, China; 2. NMPA Key Laboratory for Quality Research and Evaluation of Chemical Drugs, National Institutes for Food and Drug Control, Beijing 100050, China)

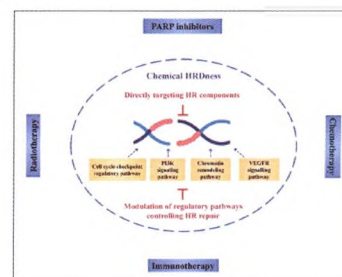
The potential anti-coronavirus activity of antipsychotic drugs (phenothiazines) can be used for drugs repurposing and anti-coronavirus drugs developing.



2535

**Research progress in targeting homologous recombination repair for tumor therapy**ZHONG Zhen-xing<sup>1</sup>, PENG Xin<sup>1,2</sup>, KONG De-xin<sup>1\*</sup>*(1. School of Pharmacy, Tianjin Medical University, Tianjin 300070, China;**2. Department of Systems Biology, the University of Texas MD Anderson Cancer Center, Houston, TX 77030, USA)*

Homologous recombination (HR) repair with molecularly targeted agents by directly targeting HR components or modulating its regulatory pathways can achieve the "HRDness" phenotype, resulting in "synthetic lethality" in HR-proficient cancers together with PARP inhibitors, or sensitizing cancers to traditional radio/chemotherapy and novel immunotherapy.



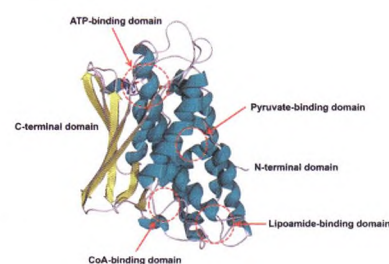
2549

**Research progress on pyruvate dehydrogenase kinase inhibitors**

ZHANG Zuo-peng, ZHONG Ye, CHENG Mao-sheng, LIU Yang\*

*(Key Laboratory of Structure-Based Drug Design and Discovery (Ministry of Education), Shenyang Pharmaceutical University, Shenyang 110016, China)*

This article introduced the reported research progress of pyruvate dehydrogenase kinases (PDKs) inhibitors according to the classification of different inhibitory sites including pyruvate binding site, CoA binding site, lipoamide binding site and ATP binding site.



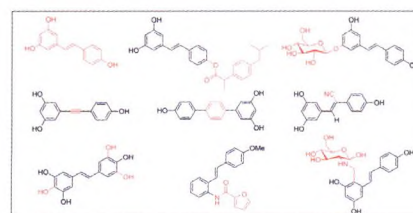
2558

**Research advances on structural modifications to resveratrol and their effect on biological activities**

HAN Li, LI Hong-peng, LI Wen-ling\*

*(College of Chemical and Biological Engineering, Lanzhou Jiaotong University, Lanzhou 730070, China)*

The structural modification of resveratrol, the chemical synthesis, biological activities and pharmacological actions of resveratrol analogues and derivatives in recent 10 years were reviewed in this paper. The future development and application of this kind of compounds are also prospected.



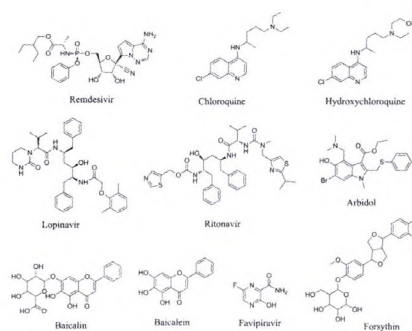
2570

**Metabolism and pharmacokinetics of drugs applied for the treatment of Corona Virus Disease 2019 (COVID-19)**

PAN Lu-lu, ZHONG Da-fang\*

*(Shanghai Institute of Materia Medica, Chinese Academy of Sciences, Shanghai 201203, China)*

Based on Chinese clinical guidance for COVID-19 pneumonia diagnosis and treatment (7<sup>th</sup> edition), the metabolism and pharmacokinetics of drugs used in clinical treatment of COVID-19 were reviewed. The antiviral drugs include remdesivir, chloroquine/hydroxychloroquine, lopinavir/ritonavir, favipiravir, arbidol, baicalin, baicalein and forsythol.



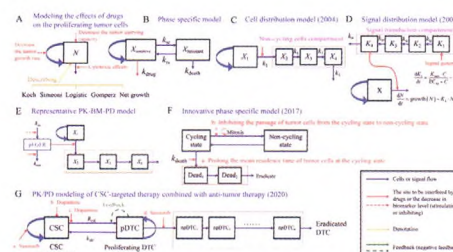
2580

**Pharmacokinetic/pharmacodynamic models of anti-tumor agents in xenograft mice: historical review, recent advances, and application in drug development**

HU Kuan, HUA Kai, YANG Jin\*

*(Center of Drug Metabolism and Pharmacokinetics, School of Pharmaceutical Sciences, China Pharmaceutical University, Nanjing 210009, China)*

Provides a systematic summary of the background, application range, and limitations of the mainstream anti-tumor agent PK/PD models. Recent advances in model structure development are reviewed in detail. Promising applications of PK/PD models in anti-tumor medicine development are discussed from the perspective of a drug's mechanism of action, optimization of combination therapy schedules, and their clinical translation.

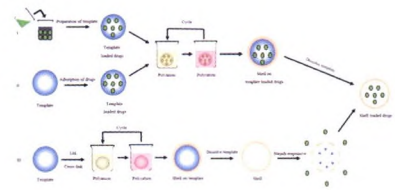




2595

**Research progress of layer-by-layer self-assembly technology in drug delivery**  
 DI Jin-wei, DU Yi-meng, GAO Xiang, ZHANG Hui, LIU Nan, ZHENG Ai-ping\*, GAO Jing\*

(Institute of Pharmacology and Toxicology, Academy of Military Medical Sciences, Academy of Military Sciences, Beijing 100850, China)



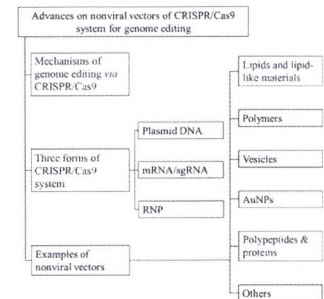
The review makes a concise overview of current progress in the research of self-assembled film prepared by layer-by-layer self-assembly (LbL) technology as drug delivery carrier. We describe in detail the LbL technology and its applications in drug delivery.

2606

**Advances on nonviral vectors of CRISPR/Cas9 system for genome editing**

WANG Yu<sup>1</sup>, HUANG Gui<sup>1</sup>, YANG Han<sup>2</sup>, ZHANG Xue-nong<sup>1\*</sup>  
 (1. College of Pharmaceutical Sciences, Soochow University, Suzhou 215123, China; 2. Jiangsu Coastal Pharmaceutical Co., Ltd., Suzhou 215215, China)

In this review, we will give a brief introduction to the mechanism of CRISPR/Cas9, problems faced by non-viral delivery of CRISPR/Cas system in forms of plasmid, mRNA and protein, examples of non-viral vectors, hoping to give some hints on design of safe and efficient non-viral vectors for genome editing.

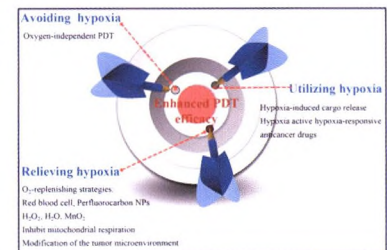


2618

**Advances in photodynamic therapy based on tumor hypoxia**

YIN Xiao-jie, WANG Xiao-qian, ZHANG Feng-ling\*  
 (School of Pharmacy, Zhejiang Chinese Medical University, Hangzhou 310053, China)

This mini-review summarizes various strategies for relieving or utilizing or avoiding tumor hypoxia to improve the efficacy of photodynamic therapy (PDT) in recent years.



**Original Articles**

2628

**TRIB3 promotes B-ALL progression by suppressing CTSZ-mediated BCR-ABL degradation**

YEERJIANG Zaiwuli<sup>1</sup>, WANG Feng<sup>1</sup>, YANG Zhao-na<sup>1</sup>, HU Zhuo-wei<sup>1</sup>, LI Ke<sup>2\*</sup>  
 (1. Institute of Materia Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China; 2. Institute of Medicinal Biotechnology, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China)



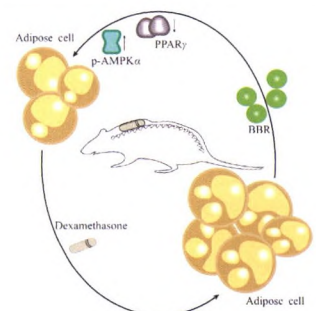
The elevated TRIB3 expression promotes B-ALL progression by disturbing BCR-ABL/CTSZ interaction and suppressing BCR-ABL ubiquitylation and degradation.

2636

**Berberine ameliorates dexamethasone-induced metabolic disorder in C57 mice**  
 MA Xiao-lei<sup>1</sup>, JIANG Wei<sup>2</sup>, FAN Wei-ming<sup>2</sup>, FU Xiao-feng<sup>2</sup>, WANG Lu-lu<sup>1\*</sup>, JIANG Jian-dong<sup>1</sup>

(1. Institute of Materia Medica, Peking Union Medical College, Chinese Academy of Medical Sciences, Beijing 100050, China; 2. Zhejiang Zhenyuan Pharmaceutical Research Institute, Shaoxing 312071, China)

Berberine can alleviate dexamethasone-induced metabolic disorder and visceral fat accumulation through modulating PPAR $\gamma$  and p-AMPK $\alpha$  expression. This study showed a new light on the treatment of glucocorticoid-induced side effects.

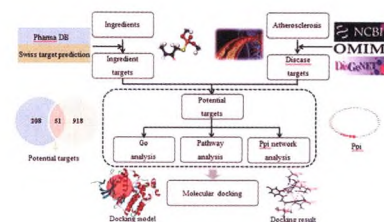


2642

### Possible mechanisms by which *Polygonati rhizoma* opposes atherosclerosis based on network pharmacology and molecular docking analyses

GAO Feng-feng<sup>1</sup>, PEI Yan-ling<sup>2</sup>, REN Yue<sup>1</sup>, CHEN Zi-jun<sup>1</sup>, LU Jian-qiu<sup>1\*</sup>, ZHANG Yan-ling<sup>1\*</sup>

(1. School of Chinese Material Medica, Beijing University of Chinese Medicine, Beijing 100102, China; 2. XinMinHe Testing (HeBei) Co. Ltd., Anguo 071200, China)



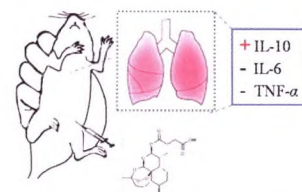
This study adopted network pharmacology research strategy to explore the multi-component, multi-target and multi-pathway action characteristics of *Polygonati rhizoma* in the treatment of atherosclerosis, and to predict the potential target and action mechanism of *Polygonati rhizoma*, so as to lay a foundation for its further research.

2651

### Therapeutic effects of artesunate on cytomegalovirus pneumonia in mice

WANG Ping, CHEN Sheng, HUANG Xiao-tao, XIAO Xiao-mei, ZHAN Qing-ping, QIN Ai-ping\*, YU Xi-yong\*

(Guangdong Key Laboratory of Molecular Target and Clinical Pharmacology, State Key Laboratory of Respiratory Diseases Pharmacology Group, School of Pharmaceutical Sciences of Guangzhou Medical University, Guangzhou 511436, China)



Artesunate can protect immunocompromised mice from murine cytomegalovirus (MCMV)-induced interstitial pneumonia via downregulating TNF- $\alpha$  and IL-6, and upregulating the expression of anti-inflammatory factor IL-10, thus attenuating inflammation in the lungs.

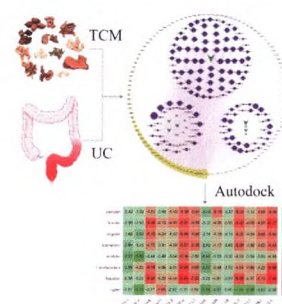
2657

### Exploration of the molecular mechanism of Lishi-Kuijie decoction in the treatment of ulcerative colitis based on network pharmacology

TIAN Rui<sup>1</sup>, LI Yu-fei<sup>2</sup>, LI Ying-qian<sup>2</sup>, ZHENG Ji-wen<sup>1</sup>, LI Hua-shan<sup>2\*</sup>

(1. Beijing University of Traditional Chinese Medicine, Beijing 100029, China; 2. Guang'anmen Hospital of the China Academy of Traditional Chinese Medicine, Beijing 100053, China)

This work explores the molecular mechanism of Lishi-Kuijie decoction in the treatment of ulcerative colitis through network pharmacology and molecular docking technology.



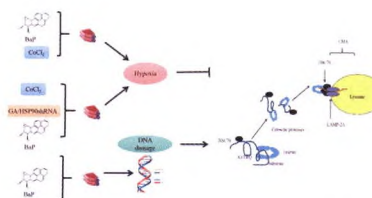
2665

### The molecular mechanism of the effect of benzo[*a*]pyrene on autophagy of molecular chaperones under simulated hypoxia

YANG Fan<sup>1</sup>, LIN Nan<sup>1</sup>, ZHANG Sha-sha<sup>1</sup>, ZHANG Meng-di<sup>1,3</sup>, HU Yu-xia<sup>2,3</sup>, BAI Tu-ya<sup>1,3</sup>, LÜ Xiao-li<sup>1,3</sup>, LI Jun<sup>2,3</sup>, XIAO Zhi-bin<sup>1,3</sup>, AO-DUN Tuo-ya<sup>4</sup>, CHANG Fu-hou<sup>1,2,3\*</sup>

(1. School of Pharmacy, Inner Mongolia Medical University, Hohhot 010110, China; 2. The Center for New Drug Safety Evaluation and Research, Inner Mongolia Medical University, Hohhot 010110, China; 3. Inner Mongolia New Drug Screening Engineering Research Center, Hohhot 010110, China; 4. Affiliated Hospital of Inner Mongolia Medical University, Hohhot 010110, China)

BaP has an inhibitory effect on CMA under the hypoxic environment. The inhibition or silence of HSP90 will enhance the inhibitory effect of BaP on CMA. In a normoxic environment, BaP causes DNA damage and promotes CMA.

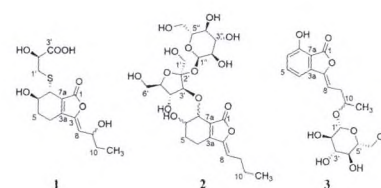


2674

### Three butylphthalide derivatives from the Rhizome of *Ligusticum chuanxiong*

YUAN Xiang, HAN Bing, FENG Zi-ming, JIANG Jian-shuang, YANG Ya-nan, ZHANG Pei-cheng\*

(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)



Three butylphthalide derivatives were isolated from the rhizome of *Ligusticum chuanxiong* using a series of isolation and purification approaches.

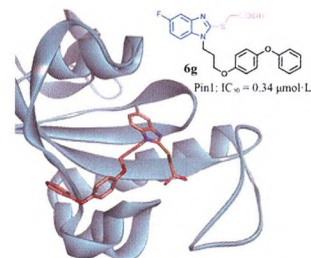
2679

**Design, synthesis and biological evaluation of peptidyl-prolyl *cis-trans* isomerase Pin1 inhibitors**LI Kun<sup>1</sup>, NIU Qun<sup>2</sup>, XU Qi-hao<sup>2</sup>, HAN Yu<sup>2</sup>, LIU Dan<sup>2</sup>, ZHAO Lin-xiang<sup>2\*</sup>

(1. Department of Pharmacy, Henan Provincial People's Hospital, People's Hospital of Zhengzhou University, School of Clinical Medicine, Henan University, Zhengzhou 450003, China; 2. Key Laboratory of Structure-Based Drugs Design and Discovery (Shenyang Pharmaceutical University), Ministry of Education, Shenyang 110016, China)

In this work, a range of 2-(1*H*-benzimidazol-2-ylthio)acetic acid derivatives were designed and prepared based on crystal structure of Pin1, among which compound **6g** displayed strong enzyme inhibition activity with IC<sub>50</sub> value of 0.34 μmol·L<sup>-1</sup>.

Structure-activity relationship and molecular docking study demonstrated that the hydrophobicity side chain at N1 position and thioacetic acid fragment at C2 position of benzimidazole were indispensable for molecules to serve as Pin1 inhibitors.

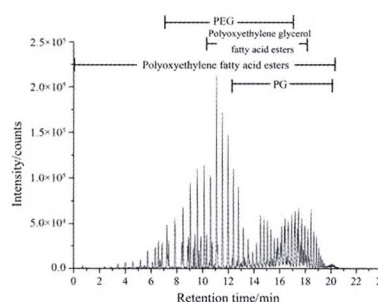


2688

**Safety study and compositional analysis of polyoxyethylene 35 castor oil by UPCC-Q-TOF-MS**LI Ting<sup>1#</sup>, WANG Jue<sup>1#</sup>, YUAN Ming<sup>2</sup>, SUN Hui-min<sup>1\*</sup>

(1. NMPA Key Laboratory for Quality Research and Evaluation of Pharmaceutical Excipients, National Institutes for Food and Drug Control, Beijing 100050, China; 2. Waters Corporation, Shanghai 201206, China)

In this paper, the UPCC-Q-TOF-MS method was established to analyze the components of polyoxyethylene 35 castor oil samples. And the safety of the samples was studied by L-02 cytotoxicity and histamine release of RBL-2H3 cell.



2695

**Analysis and health risk assessment, including recommendation of limits for heavy metals and harmful elements in Chinese patent medicines**NIE Li-xing<sup>1#</sup>, QIAN Xiu-yu<sup>1#</sup>, JIANG Qin-yue<sup>2</sup>, LI Xiang<sup>3\*</sup>, LI Jing<sup>1</sup>, ZUO Tian-tian<sup>1</sup>, CHANG Yan<sup>1</sup>, JIN Hong-yu<sup>1</sup>, DAI Zhong<sup>1</sup>, MA Shuang-cheng<sup>1\*</sup>

(1. National Institutes for Food and Drug Control, Beijing 100050, China; 2. Beijing University of Chinese Medicine, Beijing 100029, China; 3. Medical Supplies Center of the PLA General Hospital, Beijing 100048, China)

Based on big data from national post-market drug surveillance 2010-2018, residual characteristics of Pb, Cd, As, Hg, Cu and Cr in Chinese patent medicine were analyzed, basic procedures, calculation equation and specific parameters for risk assessment were clarified, and method and calculation equation for establishing residual limits were proposed.

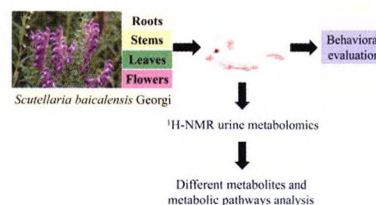


2702

**The anti-aging effects of different parts of *Scutellaria baicalensis* Georgi based on <sup>1</sup>H NMR urine metabolomics**LI Meng-ru<sup>1</sup>, ZHOU Yu-zhi<sup>1\*</sup>, CHAI Jian-xin<sup>2</sup>, CHEN Qiang<sup>2</sup>, GAO Li<sup>1</sup>, DU Guan-hua<sup>1,3</sup>, QIN Xue-mei<sup>1</sup>

(1. Modern Research Center of Traditional Chinese Medicine, Shanxi University, Taiyuan 030006, China; 2. Shanxi Zhen Dong Pharmaceutical Co., Ltd., Changzhi 047100, China; 3. Institute of Materia Medica, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100050, China)

The improvement effect of *Scutellaria baicalensis* Georgi on the *D*-galactose-induced aging rats was explained based on <sup>1</sup>H NMR urine metabolomics.

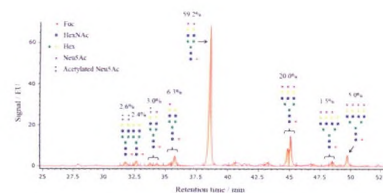


2713

### Analysis of the glycosylation heterogeneity of recombinant human pro-urokinase using UPLC-MS

TAO Lei<sup>#</sup>, YU Lei<sup>#</sup>, DING You-xue, BI Hua<sup>\*</sup>, RAO Chun-ming<sup>\*</sup>

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The inconsistency of glycosylation sites and glycotypes lead to the heterogeneity of recombinant human pro-UK, which presents a challenge to its quality control.

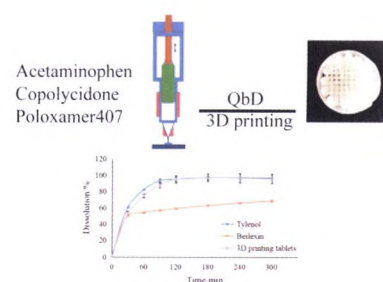
2719

### Application of "Quality by Design" in the preparation of acetaminophen sustained-release tablets by 3D printing

LIU Bo-shi<sup>1,2</sup>, WANG Zeng-ming<sup>1</sup>, ZHANG Hui<sup>1</sup>, GAO Jing<sup>1</sup>, LIU Nan<sup>1</sup>, GAO Xiang<sup>1</sup>, LI Meng<sup>1</sup>, ZHENG Ai-ping<sup>1\*</sup>

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The preparation of acetaminophen sustained-release tablets was guided by the concept of Quality by Design (QbD), which showed the flexibility of 3D printing pharmaceutical technology compared with the common preparation method.



Acetaminophen sustained-release tablets

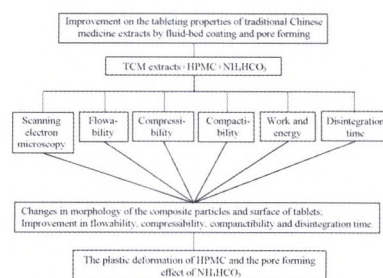
2728

### Improvement on the tableting properties of traditional Chinese medicine extracts by fluid-bed coating and pore forming

LUO Yu<sup>1</sup>, WU Fei<sup>2</sup>, SHEN Lan<sup>1</sup>, LIN Xiao<sup>1\*</sup>, FENG Yi<sup>2</sup>

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The combined use of hydroxypropyl methyl cellulose (HPMC) as a coating agent and ammonium bicarbonate as a pore-forming agent significantly improved the tableting performance of traditional Chinese medicine powders and showed certain applicability.



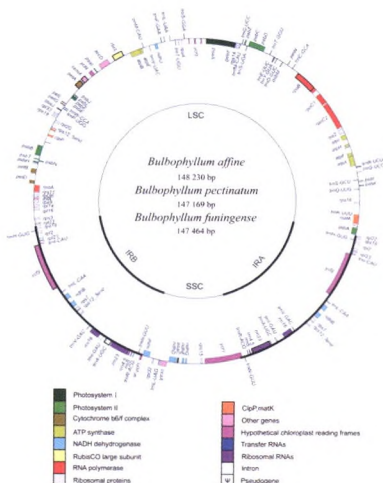
2736

### Comparative plastomic analysis of three *Bulbophyllum* medicinal plants and its significance in species identification

YANG Jia-peng<sup>1,2</sup>, ZHU Zi-le<sup>1</sup>, FAN Ya-juan<sup>1,2</sup>, ZHU Fei<sup>1,2</sup>, CHEN Yue-jun<sup>1</sup>, NIU Zhi-tao<sup>1,2\*</sup>, DING Xiao-yu<sup>1,2\*</sup>

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The plastome sequences of three *Bulbophyllum* medicinal plants (*Bulbophyllum affine*, *Bulbophyllum pectinatum*, *Bulbophyllum funingense*) have been sequenced in this study. Phylogenetic analysis showed that *Bulbophyllum* orchids were closely related to *Dendrobium* orchids. Based on the comparative plastomic method, a total of five hotspot regions have been selected for identification analysis of the *Bulbophyllum* medicinal plants.



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