









宁夏枸杞的科研与产业转化



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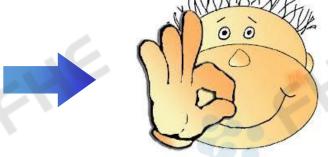
传统中医药有效推动慢性病防治



基础研究临床实验



中医理论 传统典籍



良好疗效

中药的国际化需要政府、科技、企业界的共同努力



枸杞: 古老的药食同源植物



见于《神农本草经》,上品 "久服,轻身不老,耐寒暑"

味甘,性平,入肝、肾、肺经

在保健食品中广泛使用



常用于各种功能性食疗



桂圆枸杞茶



枸杞红枣山楂茶



枸杞猪肝汤

宁夏: 枸杞的核心产区











推动中医药国际化

夯实中医药内涵,扩大枸杞子国际影响 担心:中医药成为一门学问







英国伦敦"邱园"

"立顿"红茶

宁夏枸杞



全国政协副主席梁振英5年6次调研宁夏"打通最后一公里"





宁夏枸杞贵在道地中宁枸杞道地珍品

《中华人民共和国药典》认定的唯一入药枸杞

宁夏枸杞干亿产 值发展规划





为进一步加快现代枸杞产业发展, 宁夏谋划编制了《自治区现代枸 杞产业干亿产值发展规划(2023-2030年)》,进一步加强延链补 链强链,规划到2027年,宁夏 枸杞种植面积稳定在50万亩,鲜 果产量50万吨,实现全产业链产 值680亿元;到2030年,全区新 增面积32万亩,总面积70万亩, 鲜果产量70万吨,加工转化率 60%以上,实现全产业链产值 1000亿元。



《自治区现代枸杞产业干亿产值发展规划(2023—2030年)》明确,推进产业优化升级,实现三产融合新突破,推动全区现代枸杞产业向种植规模化、管理规范化、质量标准化、市场品牌化和融合化发展。

Polysaccharides derived from berries spark interest

AGAINST RETINAL DEGENERATION AND DEPRESSION after consumption of polysaccharides derived from goji berries is being explored by neuroscientists.

may have neuroprotective effects for retinal cells and

suggests. The researchers. involved say the findings should prompt more thorough investigations of this and houseds of other traditions Chinese medicine derived compounds:

Golf berries, also known as wolfberries, are listed in the ancient Chinese book The Classic of Herbal Medicine as having benefits to the eyes, explains Kusok-Fai So, director of the Guanedone-Hone Kone-Marau In the retire are damaged due estitute of Central Nervous System Regoveration of Jinan University. His team has been studying compounds isolated hom Lyclam barbanum, one of the two medicinal species of goji benry recorded in Chinese

"Since 2007, we have been studying L. barbarum's reunsprotective effects in a series of coular hypertension nouse models, as well as in untare, with dependrative eye disease," says So, "The

of the functional resisting in goli bentes - the L burbasure polysprohoride - could elicit Important reuroprotection of

VISION OF PROTECTION The results of a year-long. double-blind placebo-control study of 42 people with

retinitis pierrentos a done ir collabration with The Hong Kong in not significant, visual acuty in Polytechnic University were published in 2019 in the Journal significantly better preserved pigmentosa, a common eye. the placabo group," explains 5a. "Retirus thickness also showed disease that affects 1 in 3,000-4,000 people, photorecapture no significant deterioration in the to inherited genetic mutations. retinas thirpad." resulting in vision loss. The patients in the study took The potential mechanism

two down of L. borbasum extract - explaining these results had each day. They were then tested been explored in a mouse for changes to the following study published by So and his parameters: visual aculty, which colleagues in Scientific Reports is the ability to discern shapes in 2016. In this shade the group and details; visual field, the showed that in a genetic mouse model of retinitis pigmentosa, apatial array of visible objects: and the thickness of the macular oral intake of L. bortonym. polysocharide may promote the anticoldant, anti-inflammatory

by the results. "Although visual and arti-apoptotic (programmed



both high and low contracts was studying elaucoma, another common eye disease that affects correlated with intraocular countries, indicated by profes hypertension. Rather than macular region in the treatment photoreceptors, staucoma stroug, while the placebo erougis - primarily affects retiral eastellon cells deeper in the eye. Once either retirul ganglion cells or

> In 2007, So's team led rat glaucomo models T reg/kg L. barburum palysarcharide each to the induction of ocular of retinal gargilon cells.

The mechanism, says So.

aplysacyheider ability to: photoreceptors are dead. they cannot regenerate, So

reduce excitotoxicity, which damages research through an overactivation of receptors by glutamate, the primary neurotransmitter in retinal nerve cells. In 2005, So was involved. in a idudy on rat meuronal cell cultures that indicated that L. harbarum protected the neurons against one type of excitotoxicity beta-ameloid

peptide toxicity lista-arreloid peptide toxicity has also been implicated in the development DEPRESSION Another arm of So's brain

research studies the antiinflammatory effects of

driven behaviours, including depression and ansiety. Using animal model of stimuli. So's team found that of retinal ganetion rall apoptosis. L. bodonum phospeptide could suggests, may be an inhibition. and immune cell activation in

plycopeptide's role in reducing inflammation in the lateral calls in the brain linked to the regulation of emotion-

depression induced by aversive reduce degressive and analous behaviours. The mechanism, So . I. barbasan plucoseptide in of abnormally activated reurons patented in China by Ningxia Between 2019 and 2021, So's. at Jinan University are also

team worked with the Affiliated studying the mechanisms of

Brain Hospital of Guarginou components isolated from Medical University to recruit L. barbarum polyspectranda. 29 adolescents with is examining L borborum

subthreshold depression, a variation that falls short of the criteria for a realor depressive episode. The participants in their study took one 300 mg L harbonim glycopeptide tablet a they for six weeks. The aim is to see if they can detect changes. in degressive symptoms. The results of this have been submitted for publication.

Behind this research is an Tiannen Goil Biotechnology So adds that his team

derived from traditional Chinese. estraction technology that provides research-grade

protect assinst damage indicad

by fatty liver and alcoholic liver

challenges has been that many

purnal aditions or reviewers are

"My vision is that our cross-

set a strong precedent for

scientifically validated finding

"One of our biggest

ADVESTISEMENT PRATURE

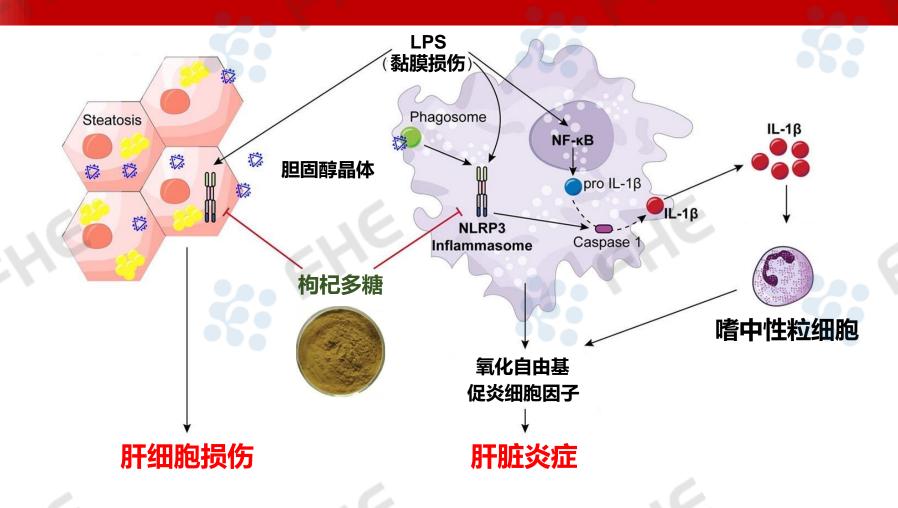
发表专著1本,评论、书 籍章节11篇,发表科研论 文50余篇,协同开展枸杞 研究,远超50项;

我们对枸杞跨学科的研 究,将有望树立一个强 有力的研究范式,针对 中医药进行科学验证

- 2021年10月6日,《自然》杂志官网 (www.nature.com) 发布 了"焦点关注-中医药"特刊
- 枸杞多糖对青少年阈下抑郁的疗效: 随机对照研究的中期分析
- 枸杞多糖在视神经治疗中的潜在作用

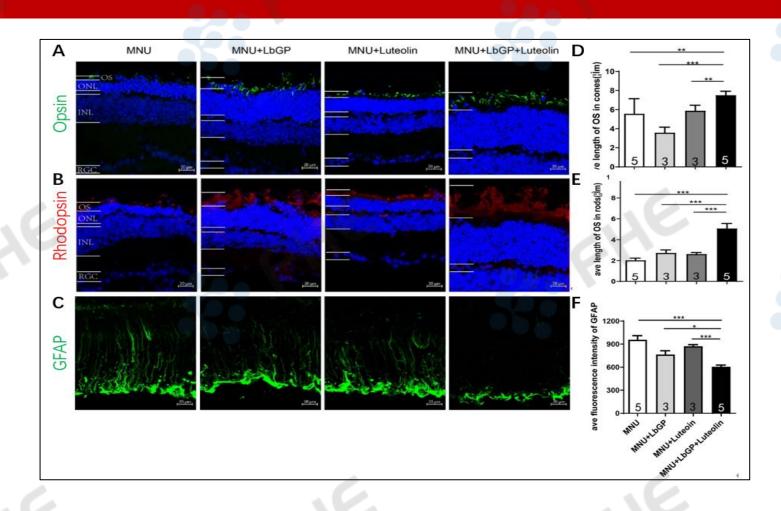


一直关注的问题—枸杞子清肝明目



枸杞多糖能够通过炎症小体途径改善NAFLD引起的肝脏损伤

一直关注的问题—枸杞子清肝明目





一直关注的问题—枸杞子清肝明目

Review



Potential role of *Lycium barbarum* polysaccharides in glaucoma management: evidence from preclinical *in vivo* studies

Yamunadevi Lakshmanan¹, Francisca Siu Yin Wong¹, Kwok-Fai So^{2, 3}, Henry Ho-Lung Chan^{1, 4, 5, 6, *}

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Lycium Barbarum Polysaccharides and Retinal Ganglion Cell Neuroprotection	2624
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Abstract

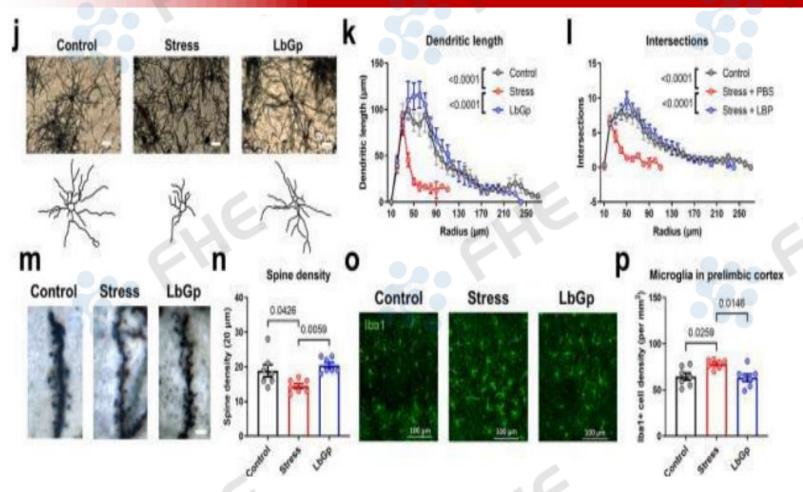
In recent years, the pharmacological benefits of herbal extracts have been revisited for their potential neuroprotective effects in glaucoma. The polysaccharides extracted from the fruits of *Lycium barbarum* L., or *Lycium barbarum* polysaccharides, exert their anti-aging effect through reducing oxidative stress, modulating the immune response, enhancing neuronal responses, and promoting cytoprotection. The therapeutic efficacy of *Lycium barbarum* polysaccharides in preserving retinal ganglion cells and their functions was demonstrated in a range of experimental models of optic neuropathies. These include the acute and chronic ocular hypertension models, the partial optic nerve transection model, and the ischemic-reperfusion injuries model. Based on these findings, *Lycium barbarum* polysaccharides appear to be a good candidate to be developed as a neuroprotective agent for treating multifactorial diseases. This review aims to present a comprehensive review on the latest preclinical evidence on the pre- and post-treatment benefits of *Lycium barbarum* polysaccharides in retinal ganglion cell neuroprotection. The possible mechanisms of *Lycium barbarum* polysaccharides mediating retinal ganglion cell neuroprotection will also be described. Moreover, the potential research gaps in the effective translation of *Lycium barbarum* polysaccharides treatment into clinical glaucoma management will be discussed.

Key Words: animal model; complementary and alternative medicine; glaucoma; retinal ganglion cell; *Lycium barbarum* polysaccharide; neuroprotection; neuro-rescue; ocular hypertension; post-treatment; pre-treatment

枸杞多糖在青光眼的治疗:来自临床前研究的证据体内研究

实验表明:LBP在治疗前和治疗后通过保存RGC的结构和功能,可以靶向多种机制,这些机制也可以促进青光眼变性中的神经保护。

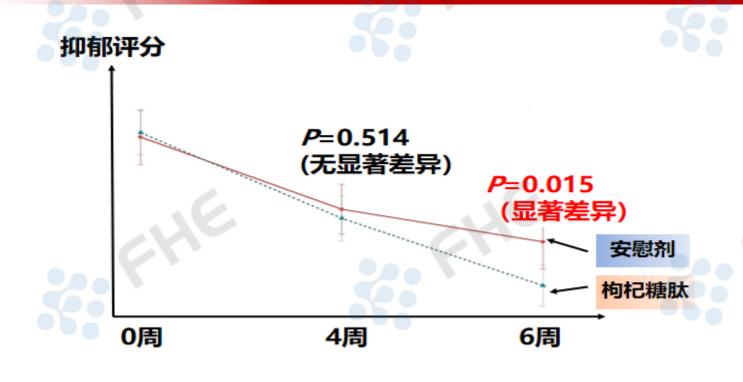
近期我们较为关注的问题——枸杞干预青少年抑郁



- (k) Sholl分析显示,CRS作用下皮层神 经元的树突状长度萎缩, 且LbGp具有 保护作用。
- (I) LbGp维持了皮质神经元的正常分支 模式。
- (n)LbGp给药后恢复CRS降低脊柱密度。
- (p) LbGp抑制CRS诱导小胶质细胞增殖

2023年,暨南大学苏国辉院士团队的张力教授的一项实验结果表明: LbGp能有效缓解 CRS作用下的焦虑样行为和抑郁行为,抑制了铁死亡途径,揭示了枸杞提取物的抗焦虑 作用机制。

近期我们较为关注的问题——枸杞干预青少年抑郁





林康广教授

广州医科大学附属脑科医院

- 已完成临床试验, 计划开展多中心临床实验(包括香港)
- 枸杞干预青少年抑郁,即将写进相关抑郁诊疗指南。

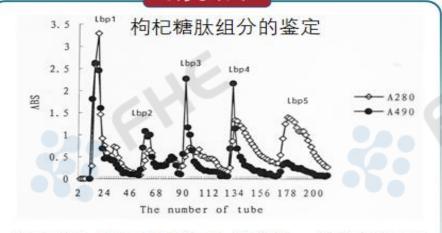




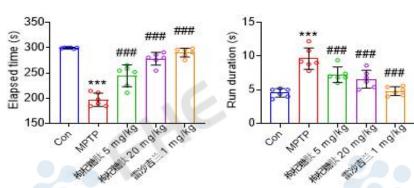
近期我们较为关注的问题 枸杞研究——转化为帕金森药物注册



研究结果



枸杞糖肽缓解PD样行为学障碍: 转棒和爬杆





暨南大学 JINAN UNIVERSITY

研究团队

苏国辉 院士



何蓉蓉 国家杰青



段文君 研究员



林晓敏 博士生



专利名称: 枸杞糖肽的用途专利申请号: MP21026369

近期我们较为关注的问题 枸杞研究——转化为帕金森药物注册





澳門特別行政區政府 Governo da Região Administrativa Especial de Macau

藥物監督管理局 Instituto para a Supervisão e Administração Farmacêutica



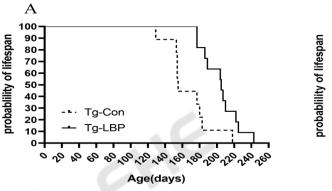
近期我们较为关注的问题 枸杞糖肽对渐冻症(ALS)的作用及机制

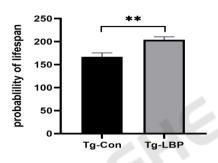


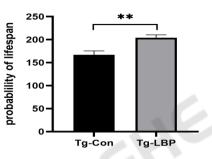
知名渐冻症患者 创办渐愈互助之家, 汇聚了国内上万渐冻 症患者,是国内乃至 世界最大的患者群;

初步实验结果

枸杞糖肽对SOD1G93A小鼠生存周期的影响





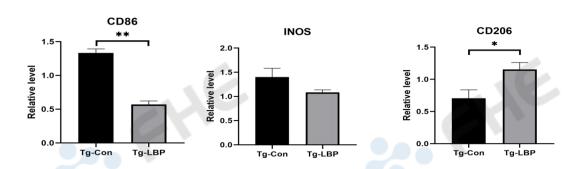


- ▶ 根据疾病终末期小鼠的翻正反射情况判断小鼠的死亡时间
- > 与Tg-Con组小鼠比较, Tg-LBP组小鼠的平均生存周期延长了37天(204.1±6.280 vs 167±8.537



刃步实验结果

枸杞糖肽对SOD1G93A小鼠M1/M2小胶质细胞的影响



- ▶与Tg-Con组小鼠比较, Tg-LBP组小鼠CD86和INOS mRNA水平明显减少, CD206 mRNA水平明显增加
- ▶ 提示枸杞糖肽可能具有促进小胶质细胞向M2型活化,抑制小胶质细胞向M1型活化的能力



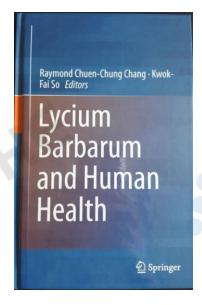
乐卫东教授

四川省医学科学院 四川省人民医院

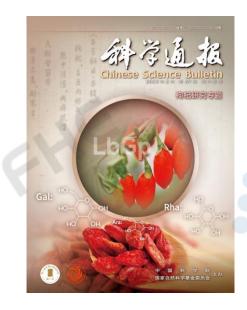
总结与展望

- 枸杞子中蕴含的各种有效成分,尤其是枸杞功效多糖 (枸杞糖肽),正在展现出更多的应用领域和场景;
- 可用于抑郁症、帕金森和病毒预防乃至治疗;
- 阐释枸杞功效科学内涵,打通"最后一公里",推动中医药-枸杞子现代化与国际化

致谢



- -《枸杞与人类健康》英文专著
- 2014年出版
- 主编:
- Raymond Chuen-Chung Chang
- Kwok-Fai So.



- -《科学通报》枸杞研究专题
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- 主编: 高福
- 特邀作者: 张力、祁伟、苏国辉
- 邀稿: 宁夏中宁枸杞 (天仁) 院士工作站

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- · 项目团队主要成员:张力、任 超然、林康广、徐颖、米雪松
- · 欢迎各领域朋友共同推动 枸杞产业发展!











Neural Regeneration Research

2022年JCR影响因子 6.1,

神经科学Q1区(42/272),细胞生物学Q2区中科院大类: 医学2区

《中国神经再生研究(英文版)》

- ✔ "中国科技期刊卓越行动计划"入选期刊
- ✓ 中国高质量科技期刊:神经病学T2类
- ✓ 连续8年入选: 中国最具国际影响力学术期刊





主编: 苏国辉 院士

