行政院國家科學委員會專題研究計畫成果報告

人參皂苷對牛性腺及腎上腺類固醇生成作用之影響
Effects of ginsenosides on steroidogenesis of gondal and adrenal cells

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一、中文摘要

我們曾首次證實人參葉之多醣具有促黃體作用之功能。本報告則繼續探討人參根及花，是否具有類似的作用。實驗仍採用凍解牛黃體細胞之體外培養法來評估。結果顯示，以熱水萃取之人參花(GF-1)，有促黃體作用，而人參根(GR-1)經相同的處理，卻不具此效應。再進一步萃取人參多醣，並比較萃取物之分子量大小的影響，證實人參花多醣(GF-2；分子量大於 10,000 d)，確實具有促黃體作用；而人參根及分子量小於 10,000 d(包括人參皂苷)，則無此作用。

關鍵詞：花、人參、促黃體作用、黃體、孕酮

Abstract

Our previous report firstly evidenced that polysaccharides isolated from ginseng leaves obtained from Jilin, China possess luteotropic activities. In this study, we made further investigations on the root and flowers of Korean ginseng by means of the same cell system described briefly as follows. Thawed bovine luteal cells (1 x 10^5 cells/ml/well) in M199 were incubated in 24-well culture plates at 37 ℃ in a 5 % CO_2 incubator. Ten μl of tested drug with 1 to 100 μg/ml were added into each well. After 4 and 24 hr incubation, the media were harvested and assayed for progesterone by enzyme immunoassay. The production of progesterone from cells is the indicator for evaluating the action of tested drugs. Results showed that hot water extracts of ginseng flowers (GF-1) with 10 to 100 μg/ml increased significantly the progesterone production, whereas those from ginseng root (GR-1) could not. Crude polysaccharides (GF-2) isolated from GF-1 is the active component and the small molecules (mw < 10,000 dalton) is excluded, indicating that the ginseng root which includes ginsenosides has no luteotropic activities, but the polysaccharides of ginseng flowers have.

Keywords: flower, ginseng, luteotropic, luteal, progesterone

二、Purpose：

The root of *Panax ginseng* has been used clinically in Chinese herbal medicine to treat many kinds of chronic diseases including hepatitis and nephritis, to enhance the immune-system activities, to increase the hypothalamo-pitiutary-adrenocortical functions and sexual ability (Wang, 1991; Fu *et al.*, 1981; Lin *et al.*, 1995; 1998a, b). Such diversity of pharmacological activities was also approved in research works (Saito, 1974; Rim, 1979; Gao *et al.*, 1989, Hu *et al.*, 1995; Lin *et al.*, 1995; 1998a; Huh *et al.*, 1998). For this reason ginseng has been called the 'king of tonic medicine' in the orient and a panacea in the west. Brekman and Dardymov (1969) even introduced a

cellular mechanism of polysaccharides of ginseng flower.

In conclusion, it is a very interesting fact that ginseng flowers, like ginseng leaves, also possess significant luteotropic activity especially in regard to possible application for reproductive clinical uses in the future. The big advantage of leaves and flowers to be harvested every year, increases the availability for drug use immensely in comparison to the ginseng roots. Also ginseng flowers are already distributed commercially on the nutraceutical sector. Further scientific work is requested on this field to analyze the exact mechanism of the polysaccharides' luteotropic activity.

四、Self-evaluation

We spent about 2 years for finishing this project and found finally that the polysaccharides isolated from ginsengs flowerscontaining the luteotropic activity. A further study to identify the polysaccharides is undergoing by the assitance from Prof. T.C. Lu, Institute of Food Science, National Taiwan University. However, the following 2 goals still have some problems:

1. The adrenal culture system is not established yet.
2. The ginosenosides data are very confused at present.

They need more time to be overcome.

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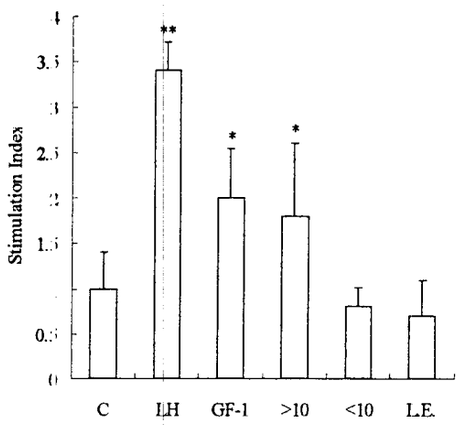

Fig 1. Progesterone production from bovine lutea cell in Medium 199 (C) for 4 hrs incubation presented with 1 ng/ml LH, 10 ug/ml GF-1, a fraction of GF-1>10,000 galton, a fraction of GF-1<10,000 dalton and a lipid extract of GF-1 (L.E.). Data are expressed in units of stimulation index (P4 treated/P4 control), n=3, *P<0.05, **P<0.01.

Table 1 Effect of GF-1 and GR-1 on the progesterone production from bovine luteal cell in vitro

	Progesterone (ng/ml/10^5 cells)	
	4hr	24hr
Basal	5.4± 1.0	15.6± 2.8
oLH 1 ng	12.6± 2.3*	47.8± 5.8**
GF-1		
1 μg	6.7± 1.2	14.6± 3.0
10 μg	8.8± 1.5*	28.7± 4.5*
100 μg	9.9± 1.0*	25.6± 2.4*
GR-1		
1 μg	5.6± 1.4	12.3± 1.5
10 μg	6.2± 1.5	10.4± 4.9
100 μg	4.7± 1.2	12.2± 6.0

Data are expressed as mean± S.D. (n=3), *P< 0.05, ** P < 0.01

Table 2. Effects of GF-2 and GF MeOH on the progesterone production from bovine luteal cells *in vitro*

	Progesterone (ng/ml/10^5 cells)	
	4hr	24hr
Basal	7.7± 1.2	19.3± 2.4
oLH 1 ng	20.3± 2.5*	61.8± 8.0**
GF-1		
10 μg	13.3± 1.6*	30.5± 4.1
GF-2		
1 μg	8.9± 1.3	16.7± 2.7
10 μg	15.7± 2.0*	38.9± 4.4*
100 μg	16.3± 2.6*	32.6± 3.7*
GF-MeOH		
1 μg	5.8± 2.0	21.3± 3.3
10 μg	6.9± 1.6	18.9± 2.5
100 μg	5.2± 1.7	16.6± 2.7

Data are expressed as mean± S.D.
(n=3), *P< 0.05 , **P < 0.01