

1 . 1 . 1 . 1 . 2 . 1

1  
2

I. 가  
7-10), 1986 Gottlow가  
11).

1). ,  
polytetrafluoroethylene(PTFE) 가  
,  
calcium sulfate가 .

가 , 2). ,  
가  
12)

3). 가

가 ,  
platelet - derived growth factor(PDGF),  
insulins - like growth factor(IGF), basic  
fibroblastic growth factor(bFGF)  
transforming growth factor(TGF) - -  
1976 Melcher가

4, 5).

6), 가

Lynch PDGF IGF - 1

13).

가  
(1997)

30).

가  
가

가

31), (1998)

가

가

32).

(H<sub>2</sub>O layer)

(Butanol layer)

가

가

14,

15), (1996)

, IL - 6

16).

II.

가

1.

17),

, IL - 1

PGE<sub>2</sub>

, collagenase

18 - 22)

23 - 25),

Dulbecco's Modified

Eagle's Medium(DMEM, Gibco Co., USA)

가

22).

15 Mℓ tube

3

26 - 28),

10% FBS(fetal bovine serum, Gibco Co., USA) 1% (Penicillin G 10,000

adenosine diphosphate

units/Mℓ, Amphotericin B 25 μg/Mℓ, Gibco Co., USA)가 가 DMEM 100mm

24, 25, 29).

(1998)

No. 15 blade

1/3

1mm<sup>2</sup>

, 60mm

5

6  
37 , 100% , 5% CO<sub>2</sub>

10% FBS 1%  
가 DMEM 3Mℓ 가 .  
2 3

2 , Trypsin -  
EDTA(0.05% Trypsin, 0.53mM EDTA,  
GIBCO/BEL, USA)

60mm

2 3  
1:3 4  
4 8

2.

100 3 가

8g 가 6g 200  
n - BuOH 150Mℓ 가  
n - BuOH (3 )  
n - BuOH 가  
2.5g, 3.5g

( )

4.

5 - 8 ,  
Trypsin - EDTA(0.05% Trypsin,  
0.53 mM EDTA, GIBCO/BRL, USA)  
trypan blue  
hemocytometer 24 - well  
plate well 1 × 10<sup>4</sup> 가 가  
1

37 , 5% CO<sub>2</sub>, 100%

19

1.5Mℓ  
enzyme solution(0.1% collagenase, 0.05%  
trypsin, 0.5mM EDTA) 가 10  
4 , cell  
1.5Mℓ ice - cold FBS 가 4

6

HBSS  
10% FBS, 1% 가 DMEM  
100mm dish 37 ,  
100% , 95% 5% CO<sub>2</sub>  
3  
2 - 3

3.

100g 1

PBS  
Dulbecco's Modified Eagle Medium (DMEM,  
GIBCO/BRL, USA) well 가  
10<sup>-3</sup>, 10<sup>-6</sup>g/Mℓ가 well  
가 , 가

3

PBS MTT(3 - (4, 5 -  
dimethylthiazol - 2 - yl) - 2 , 5 - diphenyl  
tetrazolium bromide; No. M2128, Sigma,  
USA) 250μℓ well 가  
4 CO<sub>2</sub>

200μℓ DMSO(Dimethyl  
sulfoxide, D5879, Sigma, USA) 25μℓ  
glycine buffer 가 formazan  
Plate ELISA  
analyser(Spectra. MAX 250, Molecular  
Devices Co. USA) plate 570nm

5. ALP

60mm  
 petridish  $5 \times 10^4$  cell/dish가  
 , 10% FBS가 가 DMEM 1  
 37 , 100% , 5% CO<sub>2</sub>

1  
 $10^{-3}$ ,  $10^{-6}$  g/ml가  
 가 , 3

trypsin - EDTA  
 1500rpm 8  
 0.2ml 가  
 0.1ml 0.1M  
 glycine NaOH buffer (pH 10.4) 0.2ml, 15mM  
 pNPP 0.1ml, 0.1% Triton X - 100/saline 0.1  
 ml 0.1ml 37  
 30 , 0.1N NaOH 0.6ml  
 가 . (Beckman DU -  
 650, USA) 410nm

(ANOVA) P<0.05

6.

가

Table 1. Cellular activity of PDL cells on each H<sub>2</sub>O & Butanol layer of Safflower seeds

conc. \ layer	H <sub>2</sub> O layer	Butanol
Con	2.05 ± 0.06	1.84 ±

\* : Significantly different from the

Table 2. Cellular activity of osteoblastic cells on each H<sub>2</sub>O & Butanol layer of Safflower

conc. \ layer	H <sub>2</sub> O layer	Butanol
Con	3.41 ± 0.17	3.58 ±

\* : Significantly different from the

Table 3. ALP synthesis on H<sub>2</sub>O & Butanol layer of Safflower seeds in PDL cells

conc. \ layer	H <sub>2</sub> O layer	Butanol
Control	100.00 ± 0.00	100.00 ±

\* : Significantly different from the

6well dish 1 ×  
 $10^5$  cell/well가 10% FBS,  
 1% antibiotic, 50 µg/ml ascorbic acid, 10mM  
 sodium - glycerophosphate가 가  
 DMEM

$10^{-3}$ ,  $10^{-6}$  g/ml가

3

21

well , cell 3ml  
 neutral buffered formalin (NBF) 40  
 48 , Von kossa method  
 5% silver  
 nitrate 15 - 30

III.

1.

Table 4. ALP synthesis on H<sub>2</sub>O & Butanol layer of Safflower seeds in osteoblastic cells

conc.	H <sub>2</sub> O layer	Butanol layer
Control	100.00 ± 0.00	100.00 ± 0.00
10 <sup>-3</sup> g/ml	498.50 ± 39.91*	139.10 ± 6.89
10 <sup>-6</sup> g/ml	217.29 ± 30.79*	89.47 ± 42.64

\*: Significantly different from the

(p<0.05).

3.

ALP

10<sup>-3</sup>g/Mℓ  
ALP

10<sup>-6</sup>g/Mℓ

Table 3  
10<sup>-3</sup>g/Mℓ  
(p<0.05).

10<sup>-3</sup>g/Mℓ 10<sup>-6</sup>g/Mℓ 가  
Table 1

가

10<sup>-3</sup>g/Mℓ 10<sup>-6</sup>g/Mℓ

가 (p<0.05).

4.

ALP

10<sup>-3</sup>g/Mℓ

2.

10<sup>-6</sup>g/Mℓ  
ALP

Table 4

10<sup>-3</sup>g/Mℓ 10<sup>-6</sup>g/Mℓ 가  
Table 2

가 , 10<sup>-3</sup>g/Mℓ  
가 가

10<sup>-3</sup>g/Mℓ 10<sup>-6</sup>g/Mℓ

가 (p<0.05).

Table 5. Number of mineralized calcification nodules according to the concentration of both layer in

	H <sub>2</sub> O layer			Butanol layer		
	Control	10 <sup>-3</sup>	10 <sup>-6</sup>	Control	10 <sup>-3</sup>	10 <sup>-6</sup>
Total	5	9	5	5	8	4

Concentration Unit: g/ml

Table 6. Number of mineralized calcification nodules according to the concentrations of both layer in

	H <sub>2</sub> O layer			Butanol layer		
	Control	10 <sup>-3</sup>	10 <sup>-6</sup>	Control	10 <sup>-3</sup>	10 <sup>-6</sup>
Total	6	13	10	6	7	5

Concentration Unit: g/ml

5.

10<sup>-3</sup>g/Mℓ 10<sup>-6</sup>g/Mℓ 21 가  
 (Table 5). 10<sup>-3</sup>g/Mℓ , , 가  
 , 10<sup>-6</sup>g/Mℓ . , , , ,

6.

30), 26-28). 가 가  
 10<sup>-3</sup>g/Mℓ 10<sup>-6</sup>g/Mℓ 21 (linoleic acid) 75% 가  
 (Table 6). 가 90Mℓ 30). E

#### IV.

10<sup>-3</sup>g/Mℓ 10<sup>-6</sup>g/Mℓ 가 ,  
 10<sup>-3</sup>g/Mℓ 10<sup>-6</sup>g/Mℓ 가  
 가 10<sup>-3</sup>g/Mℓ 10<sup>-6</sup>g/Mℓ ,

가

10<sup>-6</sup>g/Mℓ ,  
 10<sup>-3</sup>g/Mℓ 가

Alkaline phosphatase(ALP)

가 calcium phosphate ALP가 33-35). De Bernard(1982) 가 39).

가 36).  $10^{-3}g/M\ell$ 가  $10^{-6}g/M\ell$

가 37). ALP

ALP  $10^{-3}g/M\ell$ 가  $10^{-6}g/M\ell$ 가  $10^{-3}g/M\ell$ 가 가

$10^{-3}g/M\ell$ 가  $10^{-6}g/M\ell$ 가 V.

ALP 가  $10^{-6}g/M\ell$   $10^{-3}g/M\ell$  가

Mukai (1993) ALP (matrix vesicle)가 1.  $10^{-3}g/M\ell$   $10^{-6}g/M\ell$  (osteoprogenitor cell)가 M\ell (p<0.05). 2.  $10^{-3}g/M\ell$   $10^{-6}g/M\ell$

38). Ramakrishnan (1995)

3.  $10^{-3}g/M\ell$   $10^{-6}g/M\ell$   
 가 ,  
 (p<0.05).

4. ALP  
 $10^{-3}g/M\ell$   
 가 (p<0.05).

5. ALP 가  
 ,  $10^{-3}g/M\ell$  가  
 가 ,  
 가  
 (p<0.05).

5.  $10^{-3}g/M\ell$   
 가 ,  
 가

가 ALP 가  
 가

VI.

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