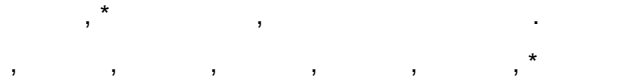


Leukemia inhibitory factor가



The Effect of Leukemia Inhibitory Factor on Embryos to the Blastocyst Formation

Bu-Kie Min, Soo-Mi Oh, Kie-Suk Kim, Gi-Youn Hong, Hun-Young Kim,
Jea-Ryang Sim and *Seung-Teak Park.

Department of Obstetrics and Gynecology, *Department of Anatomy, School of Medicine,
Wonkwang University, Iksan, Korea.

The leukemia inhibitory factor(LIF) is a sort of cytokine with immunoreactive biologic properties, which it effect in physiologic reproduction of mammals. This study was designed to determine the effect of LIF on embryonal development in in vitro culture. And the embryos were cultured in media supplemented with LIF in different concentrations.

The eggs from in vitro fertilization were assigned 29 in control group, 53 in LIF-20, 88 in LIF-40, 68 in LIF-80 respectively. And the eggs were cultured in media supplemented with LIF in different concentrations, whereas the eggs in control group were cultured in media without supplement of LIF.

And 26 eggs at 2cell stage from in vivo were also cultured in media supplemented with LIF in different concentrations.

At 72 hours culture of eggs from in vitro fertilization, there was a slight increase in rate of embryonal development to morula in both LIF-20 and LIF-40 as results of 64.15% and 75.0% respectively, compared with 51.72% in control group but the morular development in LIF-80 was inferior, 42.65% in rate. And the difference between these each groups were not significant in statistically ($P<0.05$).

And after 96 hours culture of eggs, the rate of blastocyst formation and expansion was significantly higher in both LIF-20 and LIF-40 as 56.60% and 63.63% than in control and LIF-80 as 44.83% and 35.29% respectively.

On culturing eggs from in vivo fertilization, the rates of blastocyst formation was significantly not only higher as 85.0% and 81.81% respectively in media supplemented LIF-40 and LIF-80 than 42.30% in LIF-20 but also embryonal cells viability were remakedly improved at 96 hours after culture.

Conclusively, the effect of LIF in low dose is embryotrophic but LIF in high dose is embryotoxic on eggs from in vitro fertilization.

Whereas, on culturing eggs from in vivo fertilization, LIF is more beneficial with dose dependent in high concentratrtrtion.

Key word: LIF, IVF, Embryo, Blastocyst, Cell Block.

(2000)

cytokine
IL-1(interleukin)
(Zolti , 1991; Kojima , 1994.).
4-8 (genome) 가 (Braude , 1988.)
IL-1 cytokine
(Sheth , 1991; De los Santos , 1995.).
LIF ,
cytokine
(Bhatt . 1991; Fry . 1992; Estrov . 1995.)
가 .
LIF LIF 가
가 (stem cell) 가
(Fry , 1992)
LIF 가 (Murray
, 1990; Stewart , 1992).
, cytokine,
,
(Gurdon , 1992; Jessell , 1992.).
cytokine LIF 가
protein lipoprotein lipase
LIF 가 LIF 가
(Charnock-Jones , 1994.).
LIF 가
LIF 가
,

1.

8 ICR PMSG(pregnant mare serum gonadotropin) 5
IU 48 hCG(human chorionic
gonadotropin) 5 IU . hCG
15

LIF(leukemia inhibitory factor: Sigma) 20
ng/ml, 40 ng/ml, 80 ng/ml 가 0.4% BSA(bovine serum albumin)
가 TYH(Toyoda Yokoyama Hosi) 300 μ l
30x30x10 mm (Falcon) oil 37°C,
5% CO₂ 30
10 ICR

300 μ l
37°C, 5% CO₂ 5 MWM(Modified
Whitten Medium) 300 μ l MWM
oil

2.

hCG
24
300 μ l MWM 300 μ l 2
MWM oil

3.

LIF 가 MWM 300 μ l 29
ng/ml, 80 ng/ml LIF 가 가 300 μ l MWM 20 ng/ml, 40
60, 88 26,
20, 22
37°C, 5% CO₂ 96 24

4.

student ttest
p>0.05

LIF 가 가 72
 80 ng/ml LIF 가 가 36.76%
 42.65% 가 가 40
 ng/ml LIF 가 9.09%, 75% 가
 (Table 1.).

Table 1. The effect of LIF in various concentrations on the embryonal development at 72 hours of culture for in vitro fertilized ova.

medium	control	LIF-20	LIF-40	LIF-80
cell cleavage	no. of em/oc(%)	no. of em/oc(%)	no. of em /oc(%)	no. of em/oc(%)
cell block	8/29(27.59)	11/53(20.75)	8/88(9.09)*	25/68(36.76)
morula	6/29(20.69)	8/53(15.09)	14/88(15.90)	14/68(20.58)
>morula	15/29(51.72)	34/53(64.15)	66/88(75.00)*	29/68(42.65)

§ no. of em/oc: number of embryo / oocyte.

* p>0.05 compaired with control

96
 80 ng/ml LIF 36.76%, 42.65%
 20.45%, 63.63% 40 ng/ml LIF
 가
 (Table 2.)

Table 2. The effect of LIF in various concentrations on the embryonal development to blastocyst at 96 hours of culture for in vitro fertilized ova.

medium	control	LIF-20	LIF-40	LIF-80
cell cleavage	em./oc.(%)	em./oc.(%)	em./oc.(%)	em./oc.(%)
cell block	11/29(37.93)	14/53(26.41)	18/88(20.45)	31/68(45.59)
>morula	5/29(17.24)	9/53(16.98)	14/88(15.91)	13/68(19.12)
blastocyst	13/29(44.83)	30/53(56.60)	56/88(63.63)	24/68(35.29)

em./oc: embryo/oocyte

LIF 가
 96 80 ng/ml LIF
 가 4.55%, 81.81%
 40ng/ml LIF 가 5.0%, 85.5%
 LIF 가 20 ng/ml LIF 가
 .(table. 3.)

Table 3. The effect of LIF in various concentrations on the embryonal development to blastocyst at 96 hours of culture for 2 cell from in vivo fertilization.

medium	LIF-20	LIF-40	LIF-80
cell cleavage	em./ fe.(%)	em./ fe.(%)	em./fe.(%)
cell block	9/26(34.61)	1/20(5.0)*	1/22(4.55)*
>morular	6/26(23.07)	2/20(10.0)	3/22(13.64)
blastocyst	11/26(42.30)	17/20(85.0)*	18/22((81.81)*

em./ fe.: embryo / fertilization

*: p<0.05 LIF-20 vs LIF-40 and LIF-80

96
80 ng/ml LIF 45.59% 가
26.42%, 40 ng/ml LIF 18.08% 40 ng/ml LIF
가 .(fig.1)

LIF

glycoprotein . LIF 가 M1
myeloid leukemia cell
(Gearing , 1987 Gough , 1988)

(Stewart, 1994; Mitchel , 1994).
LIF estrogen 가 10-200
ng/ml

, cytokines, estrogen
LIF 가 LIF
. LIF 가
LIF 가
(Kellokumpu-Lehtinen . 1996).

, cytokins
(Shull . 1992; Mann . 1993;
Stewart . 1994) LIF
cytokine

estrogen progesterone LIF (Kojima . 1994)
LIF 6 가 (Charnock-
Jones , 1994) LIF
LIF 가 (Kurzrock . 1991).
Jurisicova (1995) 5-20 ng/ml
LIF 가 LIF 가

80 ng/ml LIF 가
 ng/ml LIF 가
 가
 가
 가
 LIF
 LIF
 가
 가
 8
 12-24
 96
 4.5%, 81.81%
 45.59%, 35.29%
 LIF 40-
 80
 96
 20-40ng/ml
 80ng/ml
 가
 LIF
 가
 40-80ng/ml
 LIF
 가

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