

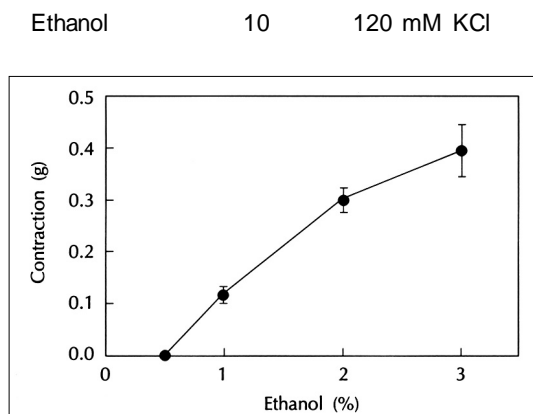


ethanol		방 법
8)9)		
9)14)	ethanol	
protein kinase C(PKC),	Sprague - Dawley rats	pentotal sodium(40 mg/
calmodulin, caffeine - sensitive $Ca^{2+}$ pool	kg)	
11)	2 mm	(ring)
ethanol	4 ml	organ bath L
15)	ethanol	PhysioLab SG10
16)17)		(Sarotech, Korea)
ethanol	cGMP	Krebs - Henseleit solution(KHS)
가		(mM) : NaCl 115, KCl 4.7, $CaCl_2$ 2.5, $MgCl_2$
PKC	phorbol ester	1.2, $NaHCO_3$ 25, $KH_2PO_4$ 1.2, dextrose 10. Organ
$Ca^{2+}$		bath 37 95% $O_2$ 5% $CO_2$
18 - 20)		1 g
Ethanol	phorbol ester	90 20
		PhysioLab P800
phorbol ester		(Sarotech, Korea)
21)		(Pentium II)
	phe -	$^{45}Ca$ uptake
nylephrine, KCl	phorbol ester	$^{45}Ca$ uptake Meisher
ethanol	ethanol	22) 37 Na - HEPES
		90 $^{45}Ca$ (1 $\mu Ci$ /
		ml) ethanol
	5 incubation	Na - HEPES
재 료 및 방법		(mM) : NaCl 120, KCl 5.0,
재 료		$CaCl_2$ 2.0, $MgCl_2$ 1.2, glucose 10 HEPES
Sprague - Dawley rat		10(pH 7.4). Incubation 가 La -
1		HEPES 100 ml 5
Phenylephrine, acetylcholine,		4 ml 45 $^{45}Ca$
phorbol 12,13 - dibutyrate, ethanol, n - butanol, t -		La - HEPES
butanol,		(mM) : NaCl 120, KCl 5.0, $MgCl_2$ 1.2, $LaCl_3$ 10,
Sigma(USA)		glucose 10, HEPES 10(pH 7.4).
. $^{45}Ca$ (1 mCi/0.1 ml) NEN(U.K.)		perchloric
		acid $H_2O_2$ 1 : 1 200 $\mu l$
$\pm$		12
maplot		$^{45}Ca$ radioactivity li -
unpaired Student's t test	p<0.05	quid scintillation counter . $^{45}Ca$ uptake
		$\mu mole/kg/5 min$

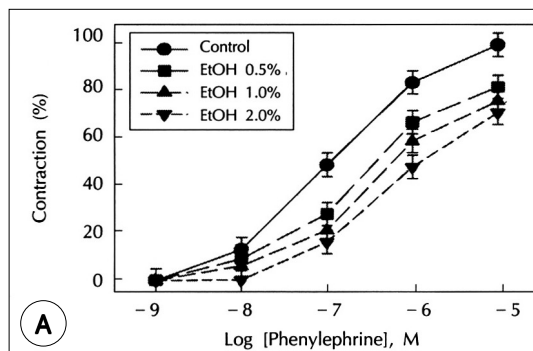
## 결 과

organ bath 90  
ethanol 가  
ethanol (Fig. 1).  
Phenylephrine KCl  
ethanol Fig. 2  
ethanol . Fig. 2 (A)  
phenylephrine ethanol

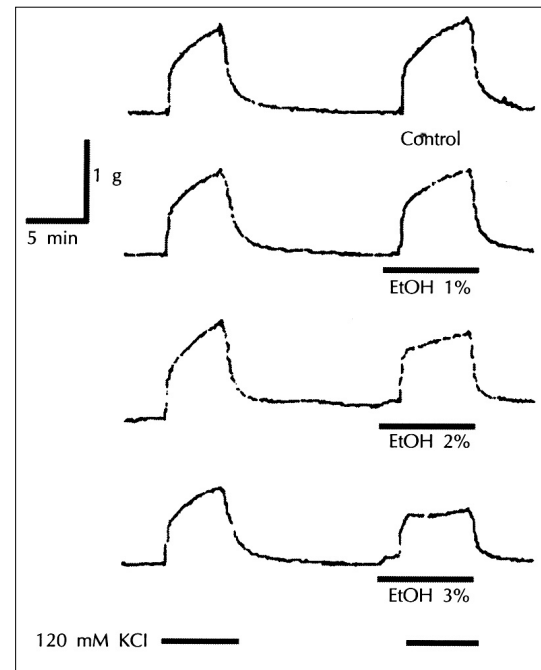
. Fig. 2 (B) KCl  
ethanol , ethanol 가



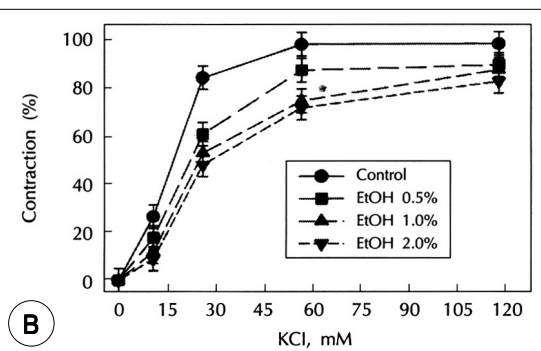
**Fig. 1.** Effect of ethanol on the contraction of rat aorta. Resting tension was 1 g. Data are mean  $\pm$  S.E.M. of four separate experiments.



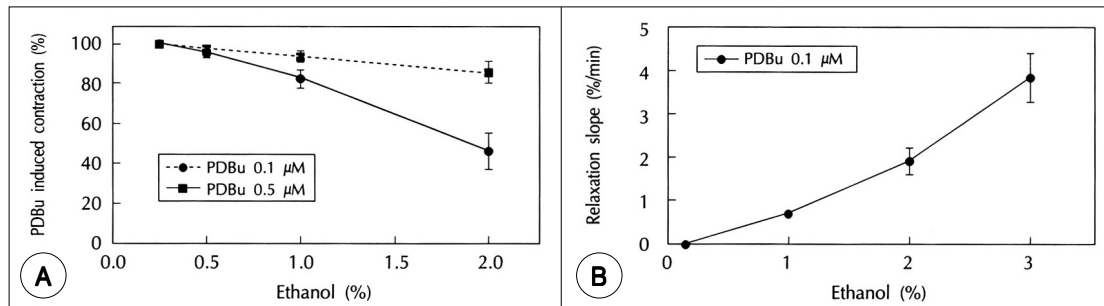
KCl ethanol  
Fig. 3  
KCl 가 ( ) 가  
가 ( ) , et -  
1% hanol 가 가  
가 가  
(Fig. 3). Ethanol 가 가  
가 가 2%



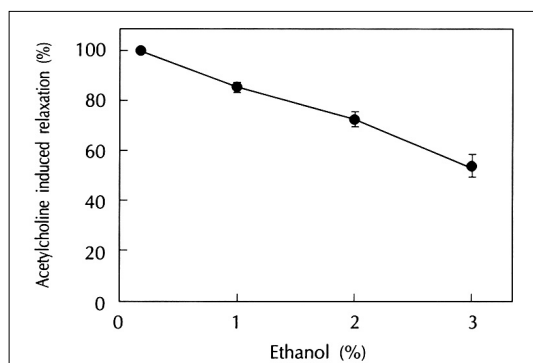
**Fig. 3.** Typical tracings of 120 mM KCl-induced contraction of rat aorta with different doses of ethanol. EtOH ; ethanol.



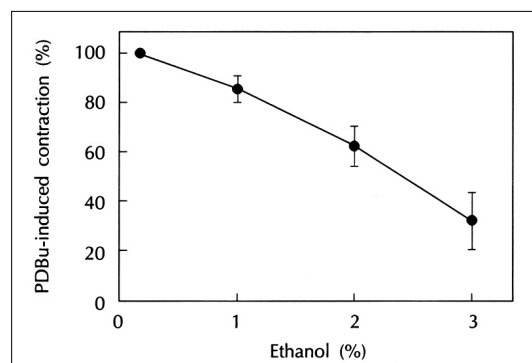
**Fig. 2.** Effects of ethanol on the contraction of rat aorta induced by phenylephrine (A) and KCl (B). The vessel was treated with ethanol 10 minutes before adding agonists. EtOH ; ethanol. Data are mean  $\pm$  S.E.M. of four separate experiments.



**Fig. 4.** Effect of ethanol on PDBu-induced contraction. (A) is the maximal contractile response and (B) is relaxation slope after ethanol treatment. In lower graph, relaxation slope is the mean difference of contractile force per minute for initial 3 minutes. Data are mean  $\pm$  S.E.M. of four separate experiments.



**Fig. 5.** Effect of ethanol on the relaxation to acetylcholine (1  $\mu$ M) in the vessel precontracted with phenylephrine (1  $\mu$ M). Ethanol was added 10 minutes before phenylephrine treatment. Data are expressed as percent of relaxation. 100% of relaxation represents relaxing effect of 1  $\mu$ M acetylcholine without ethanol. Data are mean  $\pm$  S.E.M. of four separate experiments.



**Fig. 6.** Effect of ethanol on PDBu-induced contraction in  $Ca^{2+}$  free medium. Ethanol was added 10 minutes before PDBu treatment. Data are mean  $\pm$  S.E.M. of four separate experiments.

anol KCl

PKC ethanol

phorbol ester phorbol 12,13 - dibuty - eth -

rate(PDBu)

anol

Fig. 4 PKC PDBu

ethanol PDBu

ethanol

1  $\mu$ M phenylephrine 1  $\mu$ M

acetylcholine ethanol

Fig. 5 ethanol , acetylcholine

10

PDBu  $Ca^{2+}$

1 mM EGTA 가 PDBu

ethanol ethanol

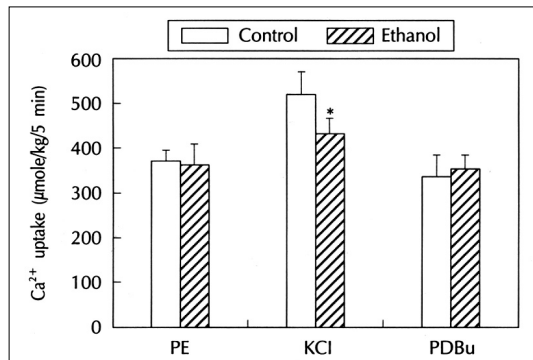
ethanol PDBu

Ethanol PKC  $Ca^{2+}$  PDBu

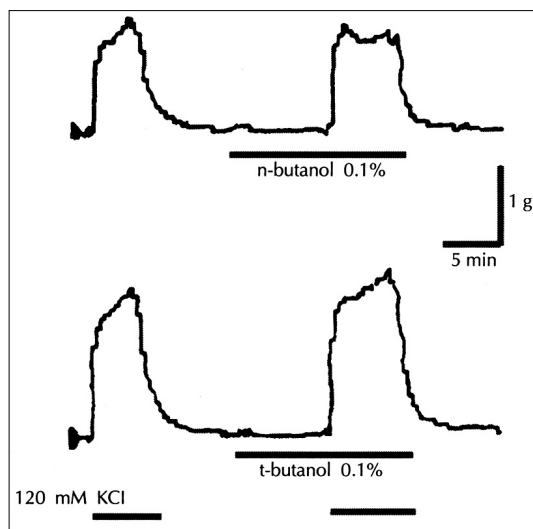
$Ca^{2+}$  flux ethanol

Fig. 7 KCl  $Ca^{2+}$  uptake

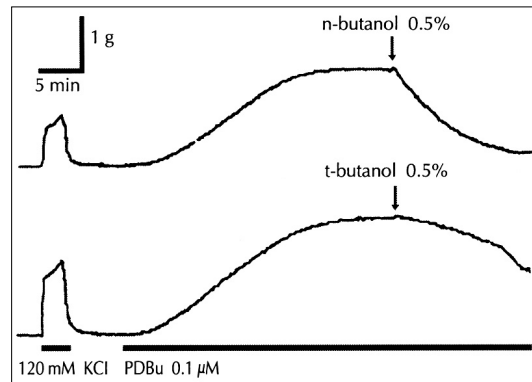
Fig. 6  $Ca^{2+}$



**Fig. 7.** Effect of ethanol on the  $\text{Ca}^{2+}$  uptake of rat aorta strips in the presence of phenylephrine, KCl or PDBu. Data are mean  $\pm$  S.E.M. of four separate experiments. \*:  $p < 0.05$ , significantly different from the control values.



**Fig. 8.** Typical tracings of 120 mM KCl-induced contraction of rat aorta with n-butanol and t-butanol. Butanol isomers were added 10 minutes before 120 mM KCl treatment.



**Fig. 9.** Effects of butanol isomers, n-butanol and t-butanol, on PDBu-induced contraction of rat aorta.

phenylephrine PDBu  $\text{Ca}^{2+}$   
up - take ethanol  
PDBu  $\text{Ca}^{2+}$   
ethanol  
가 PLD 가  
n - butanol 가 t - butanol  
KCl 가 t - butanol  
butanol 가 t - butanol

**Fig. 8**

가 n -  
butanol ethanol KCl  
t - butanol  
Butanol  
PDBu  
Fig. 9  
n - butanol t - butanol  
가 ethanol 가  
고 찰  
alpha adrenergic  
phospholipase C(PLC) PKC  
,<sup>23)</sup> PLD  
norepinephrine alpha  
가 가<sup>24)</sup>  
PLD가  
PLD  
<sup>25-28)</sup> PLD phospholipids phosph -  
atidic acid choline<sup>28-30)</sup> Phosphatidic  
acid phosphatidic acid phosphatase dia -  
cylglycerol<sup>25)30)</sup> Phosphatidic acid  
 $\text{Ca}^{2+}$  가<sup>31)</sup> phospholipase  
C ,<sup>32)</sup>  
PLD phosphatidyl -  
choline<sup>25)</sup> ethanol phosphatidylch -  
oline phosphatidyl moiety가 ethanol

phosphatidylethanol      transphosphatidy -  
lation      phosphatidic acid      Butanol  
n - butanol      KCl      가      t - butanol  
(28)(30)      phosphatidic      fluidity  
acid      PLD      가  
PLD      PKC      phorbol ester  
(26)(33)       $Ca^{2+}$       (33)(34)      .  
norepinephrine      PLD      n - butanol  
가      PLD      phosphatidic acid      ethanol  
PKC       $Ca^{2+}$       (37)      (11)  
(24)      PLD      가      가      가      가  
Ethanol      PDBu      Jover      n - butanol      t - butanol      가  
PKC      가      , PKC      가 ethanol      KCl      n - butanol  
(35)      KCl  
ethanol      KCl  
KCl  
ethanol      가      Ca<sup>2+</sup>  
uptake      ethanol      KCl      PDBu      n - butanol      PLD  
Ca<sup>2+</sup> uptake      phenylephrine      가      t - butanol      PLD  
ethanol      Ca<sup>2+</sup>      .      PLD      n - butanol  
.      Ethanol      Fig. 4      9      n - butanol  
KCl      Ca<sup>2+</sup> uptake      가      t - butanol  
L - type Ca<sup>2+</sup> channel      .      Butanol  
Wakabayashi      (21)      PLD      n -  
butanol      PLD  
.      n - butanol      가      ethanol      PLD  
phosphatidylcholine      phosphatidic acid  
가      phosphatidylethanol  
가      (38)      ethanol  
PLD  
PLD  
endothelin - 1      PLC, PLD  
multiple cellular mechanism  
가      (39) Park      (40)      PKC      ph -  
orbol myristate acetate(PMA)      PLD  
PLD      PKC      N - terminal

et -

hanol      acetylcholine

PDBu      n - butanol

ethanol

PLD

요 약

연구목적 :

가

ethanol      ethanol

결 과 :

ethanol

Ethanol    phenylephrine    KCl

가

Ca<sup>2+</sup>      pho -

rbol12,13 - dibutyrate(PDBu)

ethanol      Acetylcholine

ethanol      가      KCl      Ca<sup>2+</sup>

uptake    ethanol      phenylephrine

PDBu      Ca<sup>2+</sup> uptake      가

KCl      n - butanol

t - butanol      가      Protein

kinase C      PDBu      n -

butanol      t - butanol

결 론 :

ethanol      et -

hanol      phospholipase

D

중심 단어 :      Ethanol · Butanol · Protein

Kinase C · Phospholipase D.

1998      (

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