

## FABP2

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FABP2

PPAR $\alpha$  FABP2

PCR-RFLP

( Gas Chromatography )

BMI

$\omega$ -3  $\omega$ -6 ( PUFA )

( SFA )

$\omega$ -3

(  $p < /$  )

FABP2

PPAR $\alpha$

(  $p < /$  )

Thr54

PPAR $\alpha$

Lue162

Val162

FABP2

Ala54

Lue162 Ala54

Val162 Thr54

Thr54

$\omega$ -3  $\omega$ -6 PUFA SFA

Ala54

DNA

(Lusis 2000)

Hokanson )

(1995; Bingham 2002; Arab 2003

(and Austin 1996

Steinberg et al. )

1997; Kooner et al. 1998; Carlsson et al.  
(2000; Lind et al. 2000

(Jouven et al. 2001)

(Masson et al. 2003)

(FABP)

Agostoni et al. 1994; )

(Scaglioni et al. 2006

(FABP2)

TG

HDL-C

(A54T)

(Wajchenberg 2000;Denke 2001)

A54T

FABP2

(Baier et al. 1996; Levy et al. 2001)

Garaulet et al. 2001; )

(Vessby 2003; Tremblay et al. 2004

(Georgopoulos et al. 2000; Ribalta et al. 2005)

FABP2

(Aro 2003)

Vessby )

FABP2

(2000; Riccardi et al. 2004

)

(

(

)

MUFA Saturated Fatty Acid SFA)

( Monounsaturated Fatty Acid

(Polyunsaturated Fatty Acid ( PUFA )

Ma et al. ) .

/

$$n = \left( \frac{[Z_{1-\alpha/2}] + [Z_{1-\beta}]}{d} \right)^2 \quad \text{where } d = \frac{|\bar{D}_1 - \bar{D}_2|}{\sqrt{2\sigma_d^2}}$$

$$d = \frac{|\bar{D}_1 - \bar{D}_2|}{\sqrt{2\sigma_d^2}} \quad \text{if } \bar{D}_1 - \bar{D}_2 = 2mm/l$$

$$d = \frac{2}{3.3} = 0.61 \quad n =$$

( Germany ) Seca

l ( ) BMI

Ala54Thr

%

FABP2

×g

μL

C

C

FABP 2

Thr 54 Ala/Ala

( )

)

HDL-CL LDL-CL

(

VLDL ( Roche, Germany)

Optima TL X (d<1.006 g / L)

rpm ( fixed-angle, BECKMAN, USA

16 °Cflnj 2

ApoB (Ordovas 1998)

( )

ApoCIII

(Randox, England)

Gas)

( chromatography

: (GasChoromatography)

Folch

Ala/Ala

Ala/Thr

Folch et al. )

$$(H_0 = \bar{D}_1 = \bar{D}_2)$$

$$1 - \beta = 0.80 \quad \alpha = 0.5$$

(1957

$$\alpha = / \quad \beta = /$$

Thr54 allele  
 Ala54 allele bp  
 bp bp  
 : PPAR $\alpha$  Lue162Val (BF3)  
 PPAR $\alpha$  Lue162Val  
 (C) (G) °C  
 Mismatch PCR ( / ) HCl  
 Forward : 5-GAC TCA AGC TGG TGT  
 Reverse – Misatch : 5- ATG ACA AGT -3  
 CGT TGT GTG ACA TCC CGA CAG AAT  
 Mismatch ) -3  
 Vohl et al. )( Reverse Primer  
 ( ) Hinf I .(2000  
 bp PCR  
 Allele bp  
 bp Allele  
 : PPAR $\alpha$   
 PCR – RFLP  
 DNA  
 ( Amplification)  
 Forward : 5-ACA ATC ACT  
 Reverse : CCT TAA ATA TGG TGG -3  
 TAG GGA CAG ACA GGA CCA 5-AAG  
 .(Jamshidi et al. 2002) GTA -3. )(24 l  
 Taq I  
 GG  
 CG bp  
 bp  
 :  
 % PCR  
 One Sample Kolmogrove–Smirnov  
 Doc System  
 50 bp ladder

Genamic DNA : DNA ( )  
 Qiagene , ) Flexi Gene DNA Kit  
 ( GmbM, Germany  
 DNA

: FABP2 Ala54Thr  
 Polymerase )  
 Chain Reaction –Restriction Fragment  
 Length Polymerase ) PCR-RFLP  
 PCR DNA Amplification ..

Forward : .  
 5-ACA GGT GTT AAT ATA GTG AAA  
 Reverse : 5-TAC CCT GAG AG -3  
 Vimalleswaran ) TTC AGT TCC GTC -3  
 $\mu$ L .(et al. 2006

$\mu$ L hin61 /  $\mu$ L PCR  
 $\mu$ L X Tango  
 °C (overnight)

°C

%

PCR

One Sample Kolmogrove–Smirnov

Doc System

50 bp ladder

Kunesova et al. 2002; ) ( t .  
(Dwyer et al. 2004 -

) n-16 ( ) n-14 FABP2  
Thr54 ( ) n-18 ( ) PCR-RFLP  
Ala54 % / .  
Ala54 Thr54 % / Val162  
Thr54 ( AA ) ,FABP2 . GC  
Ala54 Thr54  
) Thr54  
(  
Thr54 Ala54

Finn EPA ( $p < /$  )  $\alpha$  ( $p < /$  )  
( $p < /$  )PUFA ( $p < /$  ) SFA ( $p < /$  )  
 $\omega - 3$  ( $p < /$  )  $\omega - 6$  ( $p < /$  ) MUFA  
Ala54 Thr54 (  $p < /$  )  
( )  
Val162 Lue162) PPAR $\alpha$   
(GC GG

Rossner et al. 1989; ) .  
(Tremblay et al. 2004

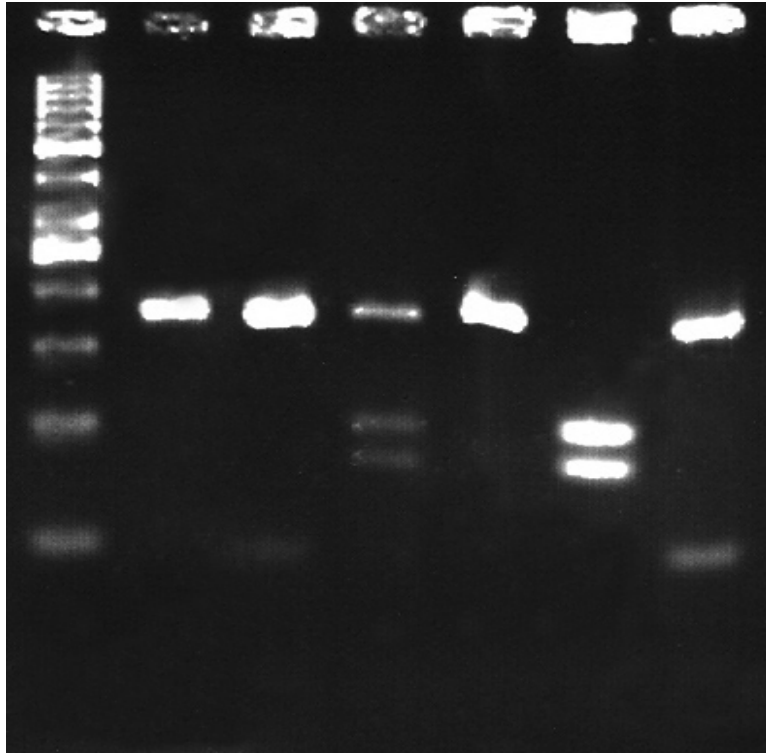
in-vivo FABP2

Finns de novo  
Pima (Vidgren et al. 1997) Ma et al. 1995; Salo )  
Thr54 Ala54 Vessby ;et al. 2000; Warensjo et al. 2006  
(2003

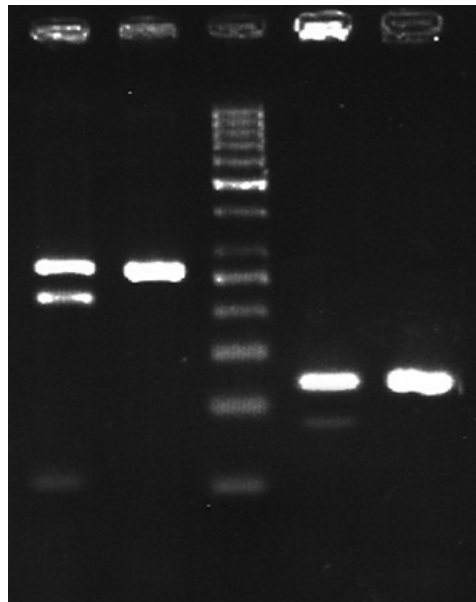
(AA) .(Pratley et al. 2000) )  
Ala54 Thr54

(SFA)			
	$\omega$ -3 $\omega$ -6 (PUFA)		
Ala54	Thr5	Decsi et al. 1996; Samuelson et al. )	
	FABP2-Thr54		(2001
	FABP2-Ala		
(Marin et al. 2005)			( LCPUFA )
			Decsi
			.(Decsi et al. 1996)
	SFA		
	PUFA /SFA		TG ( AA/ LA )
	( PUFA)		
			TG ( AA/DGLA)
	.(Klein-Platat et al. 2005)		
	n-3 PUFA SFA	Thr54 n-6	
Klein-Platat ).		Ala54	
	.(et al. 2005	n-6	
	PUFA n-3	.(Decsi et al. 1996)	
.(Rossner et al. 1989)			
	PUFA n-3		.(Phinney et al. 1994)
(Klein-Platat et al. 2005)			
	PUFA n-3		
.(Klein-Platat et al. 2005)			.(Nakamura et al. 2001)
n-3			
Thr54	EPA	(AA)	
	Ala54		
		Gasperikova et al. )	(AA)
			.(2002

Lue162Val Thr54  
 Baier et al. ) Ala54  
 val162 Lue162 . (1995  
 Val162 Thr54  
 PUFA n-3 22-6n-3  
 .(Couet et al. 1997)  
 Finn  
 (Urban et al. 1989).  
 PUFA  
 Garaulet et al. ) . SFA  
 (2001  
 Thr54  
 FABP2 Ala54  
 PPAR $\alpha$  Lue162 Val162  
 Ala54 Val162 Thr54 . (Garaulet et al. 2001)  
 Lue162  
 PUFA SFA Thr54  
 Ala54 Thr54  
 $\omega$ -3  $\omega$ -6  
 TG PUFA n-3  
 Vessby ) . HDL-CL  
 .(2003; Riccardi et al. 2004  
 Lue162Val PPAR $\alpha$   
 ) FABP2  
 ( ) ( )  
 Val162 Lue162  
 FABP2  
 PPAR $\alpha$  Lue162Val



(A) FABP2 PCR-RFLP – (B) PPARα  
 Ala54 / Ala ( bp ) Thr54/Thr ( bp ) Ladder : ( A  
 Ala54 / Thr ( bp ) Thr54/Thr ( bp ) Ala54/Ala ( bp ) bp)



(B) Lue162/Val ( bp ) Lue162/Lue : ( B  
 GC ( bp ) GG ( bp ) Ladder ( bp )



P value*				
	( )	( )	( )	
-	( )	( / )	( / )	
/	( )	( / )	( / )	Thr54 carriers(%)
/	( / )	( / )	( / )	V162 carriers (%)
/	( / )	( / )	( / )	C7 carriers (%)
/	/ ± /	/ ± /	/ ± /	Age
/	/ ± /	/ ± /	/ ± /	BMI
/	/ ± /	/ ± /	/ ± /	TG (mg/dL)
/	/ ± /	/ ± /	/ ± /	Total CL (mg/dL)
/	/ ± /	/ ± /	/ ± /	LDL-CL (mg/dL)
/	/ ± /	/ ± /	/ ± /	HDL-CL (mg/dL)
/	/ ± /	/ ± /	/ ± /	VLDL (mg/dL)
/	/ ± /	/ ± /	/ ± /	FBS (mg/dl )
/	/ ± /	/ ± /	/ ± /	APOB (mg/dL)
/	/ ± /	/ ± /	/ ± /	APOCIII (mg/dL)

Mean±SD t \*

## FABP2

P valve***	(µg/ml)		Fatty acids
	Ala/Thr Thr/Thr	= = *	
/	/ ± /	/ ± /	(C14:0)
/	/ ± /	/ ± /	(C16:0)
/	/ ± /	/ ± /	(C18:0)
/	/ ± /	/ ± /	(C18:1, n-9)
/	/ ± /	/ ± /	(C18:2n-6) LA
/	/ ± /	/ ± /	(C20:0)
/	/ ± /	/ ± /	(C18:3, n-6) GLA
/	/ ± /	/ ± /	(C20-1)
/	/ ± /	/ ± /	(C18:3, n-3)
/	/ ± /	/ ± /	(C20:2, n-6)
/	/ ± /	/ ± /	(C22:0)
/	/ ± /	/ ± /	(C20:3, n-6) DGLA

/	/ ± /	/ ± /	(C20:3, n-3)		
/	/ ± /	/ ± /	(C20:4, n-6) AA		
/	/ ± /	/ ± /	(DDA, C22:2, n-6)		
/	/ ± /	/ ± /	(C20:5, n-3) EPA		
/	/ ± /	/ ± /	(C24:1)		
/	/ ± /	/ ± /	(C22:6, n-3) DHA		
/	/ ± /	/ ± /			
/	/ ± /	/ ± /	MUFA		
/	/ ± /	/ ± /	PUFA		
/	/ ± /	/ ± /	n-6		
/	/ ± /	/ ± /	n-3		
/	/ ± /	/ ± /			
/	/ ± /	/ ± /	EPA	DGLA	AA
/	/ ± /	/ ± /		n3	n 6
Mean±SE					
	Ala54Thr54	Thr54/Thr		Thr54 /Thr	*
			Ala54/Thr +Thr54/Thr	Ala54/Ala	**
	Ala54/Ala		Ala54/Thr+Thr54/Thr	t	***

## (GC GG Lue/Val Lue/Lue)PPARα

μg/ml						Fatty acids
P value*	GC	GG	P value*	Lue/Va	Lue/Lue	
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C14:0)
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C16:0)
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C18:0)
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C18:1, n-9)
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C18:2n-6) LA
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C20:0)
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C18:3, n-6) GLA
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C20-1)
/	/ ± /	/ ± /	/	/ ± /	/ ±21/1	n-3)
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C18:3,
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C20:2, n-6)
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C22:0)
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C20:3, n-6) DGLA
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C20:3, n-3)

	/ ± /	/ ± /	/	/ ± /	/ ± /	(C20:4, n-6) AA
/	/ ± /	/ ± /	/	/ ± /	/ ± /	
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(DDA, C22:2, n-6) (C20:5, n-3) EPA
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C24:1)
/	/ ± /	/ ± /	/	/ ± /	/ ± /	(C22:6, n-3) DHA
/	/ ± /	/ ± /	/	/ ± /	/ ± /	
/	/ ± /	/ ± /	/	/ ± /	/ ± /	
/	/ ± /	/ ± /	/	/ ± /	/ ± /	MUFA
/	/ ± /	/ ± /	/	/ ± /	/ ± /	PUFA
/	/ ± /	/ ± /	/	/ ± /	/ ± /	n-6
/	/ ± /	/ ± /	/	/ ± /	/ ± /	n-3
/	/ ± /	/ ± /	/	/ ± /	/ ± /	
/	/ ± /	/ ± /	/	/ ± /	/ ± /	AA EPA DGLA
/	/ ± /	/ ± /	/	/ ± /	/ ± /	n3 n6

\*\*

t

\*

Mean±SE

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