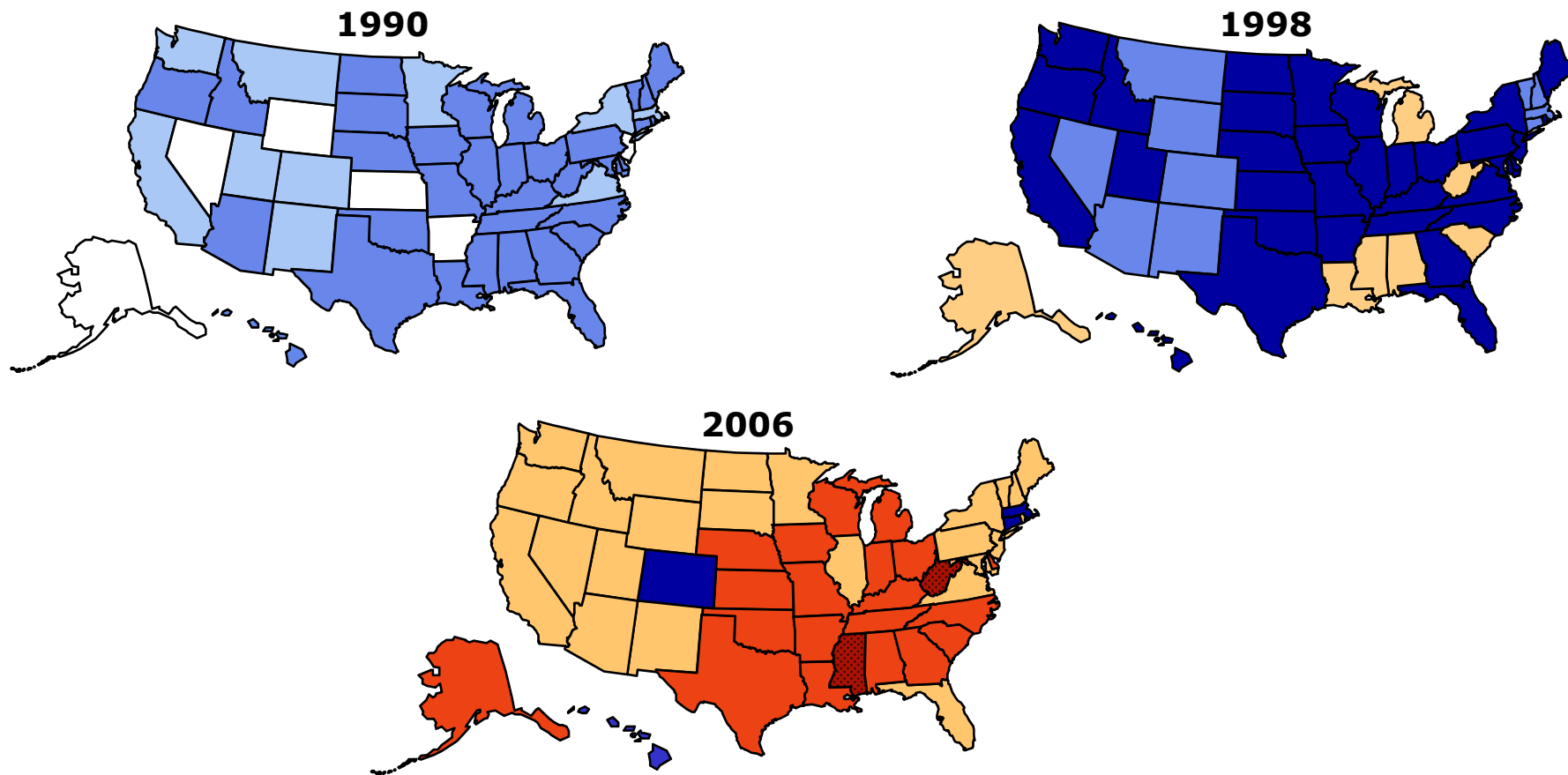


# **Fiskeproteinhydrolysat (FPH) reduserer fedme. Kjenner vi årsaken?**

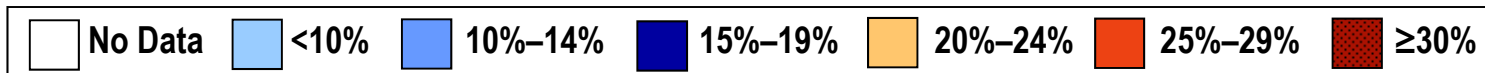
Bjørn Liaset

Sjømat og helse,  
Nasjonalt institutt for ernærings- og  
sjømatforskning (NIFES)

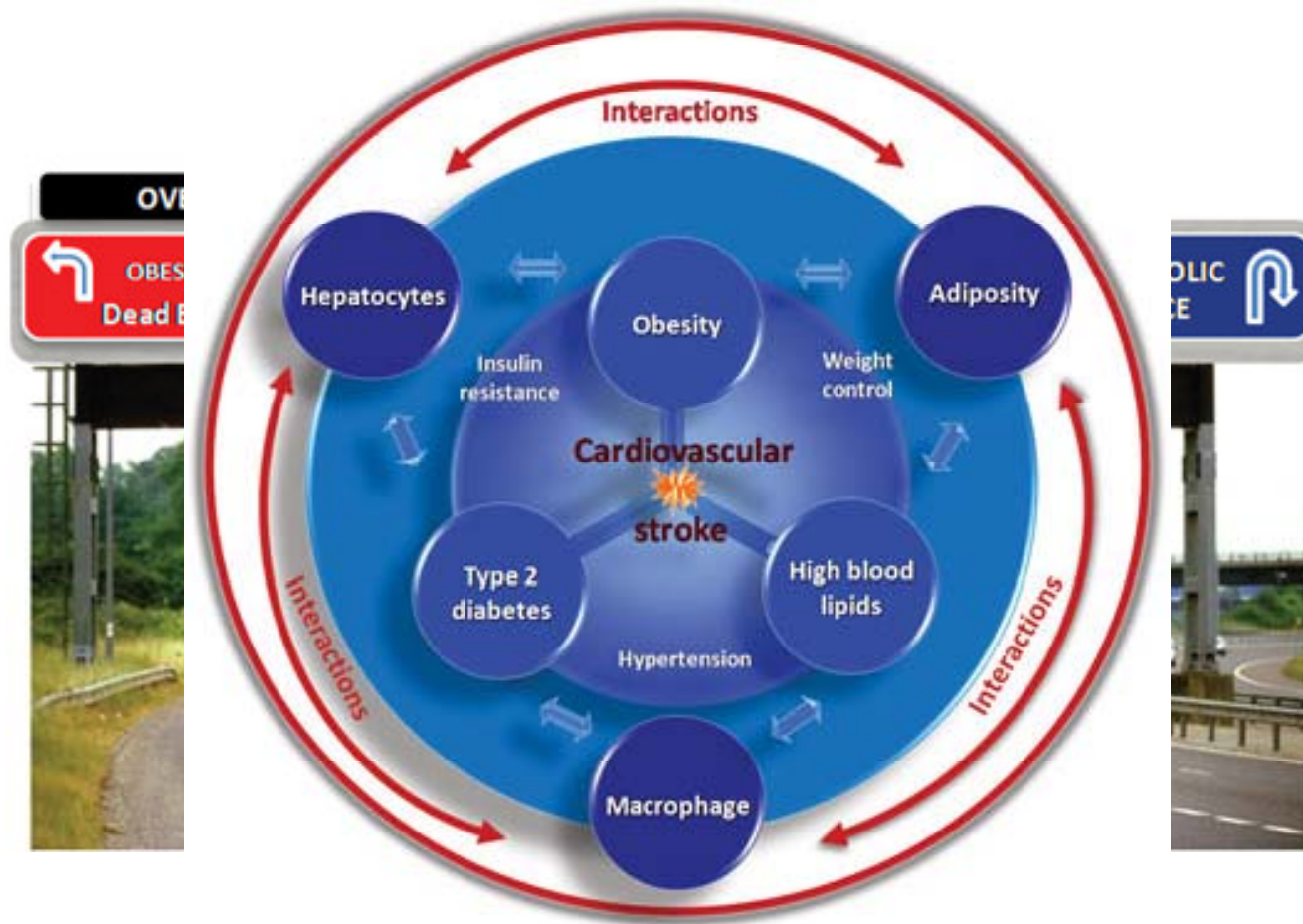
## BMI ≥ 30 (kg/m<sup>2</sup>) i USA



Source: <http://www.cdc.gov>



# Overvekt aukar – so what?



## Fedme og metabolisk syndrom

### Definitions for the Metabolic Syndrome

#### WHO 1999

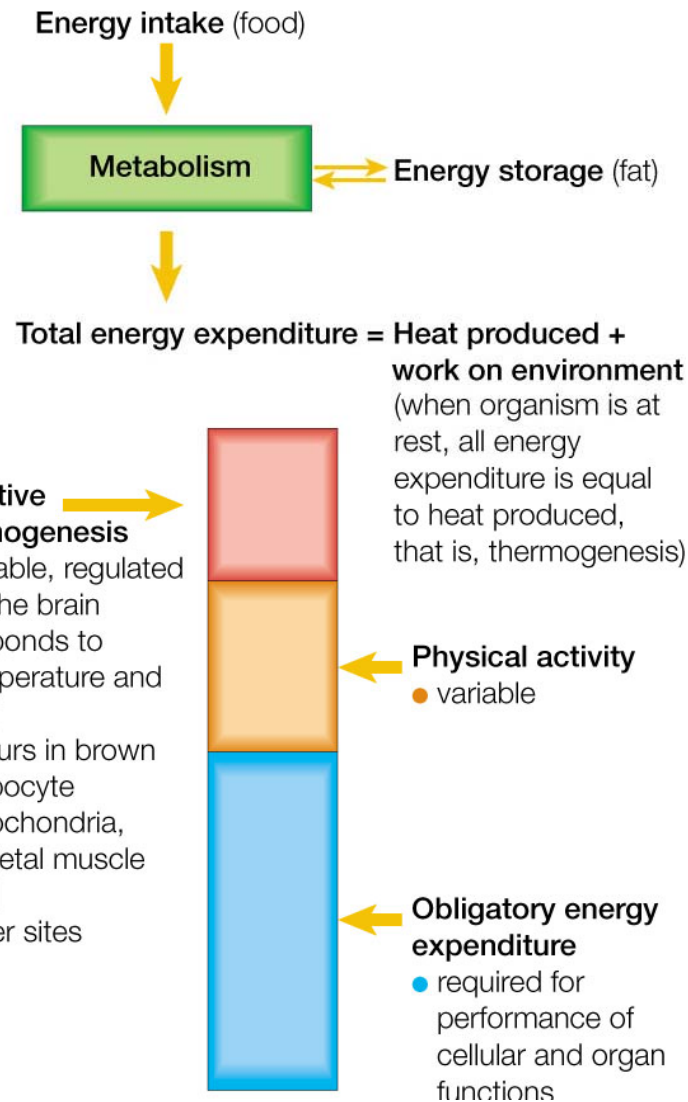
- Dysglycemia (DM, IFG, IGT, IR) + 2 of:
  - BMI > 30 or ↑WHR (>0.90 males/>0.85 females)
  - Dyslipidemia (Trig ≥ 1.7 mmol / low HDL (<0.9 males/<1.0 females))
  - BP >140/90 mmHg
  - Micro alb (alb excm > 20 µg/min)

#### ATP III

- 3 or more of:
  - ↑ waist (>102 cm in males/>88 females)
  - Dyslipidemia (Trig ≥ 1.7 mmol/low HDL (<1.0 mmol/<1.3 mmol))
  - BP ≥ 135/85 mmHg
  - FPG ≥ 6.1 mmol/L

## Kvifor overvekt ?

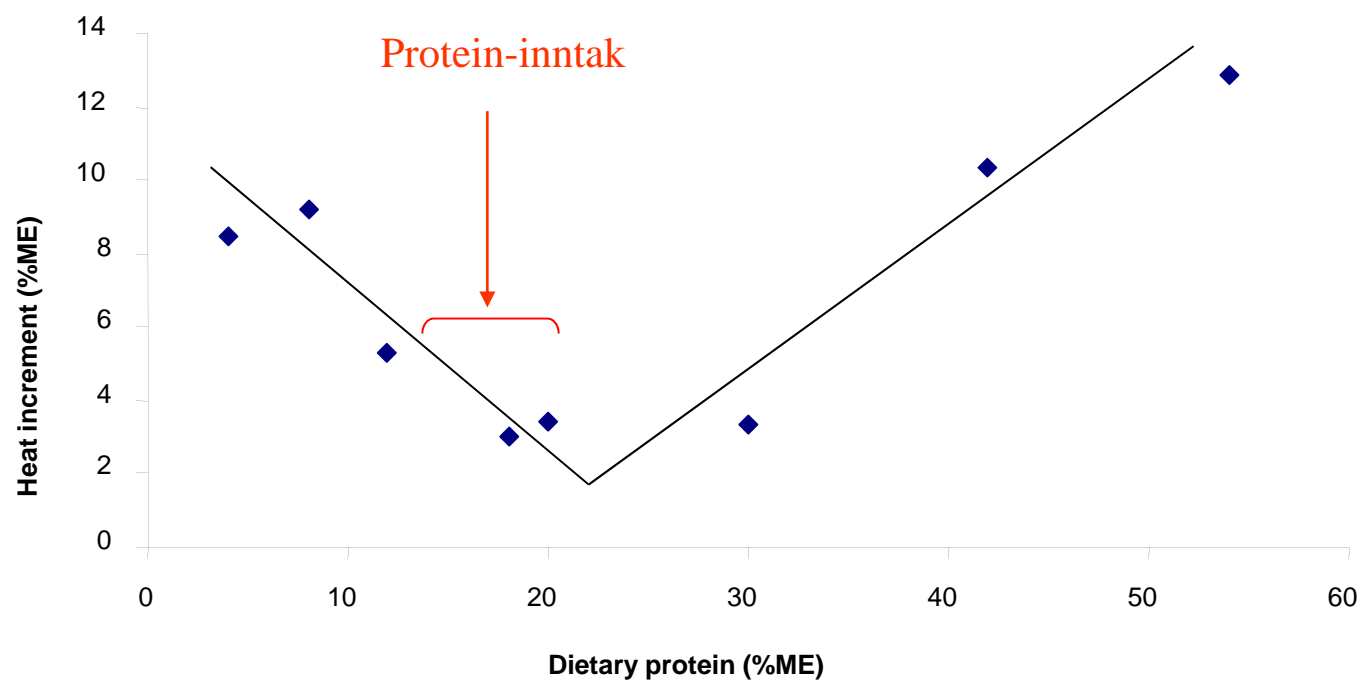
- Protein !!!**



Lowell & Spiegelman 2000  
Nature 404: 652

## Protein i kosten og energiforbruk

Data frå TS Hamilton 1939 J Nutr

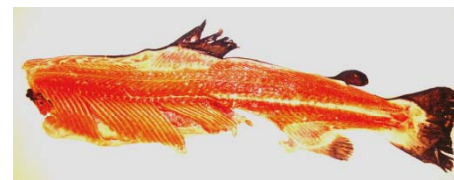
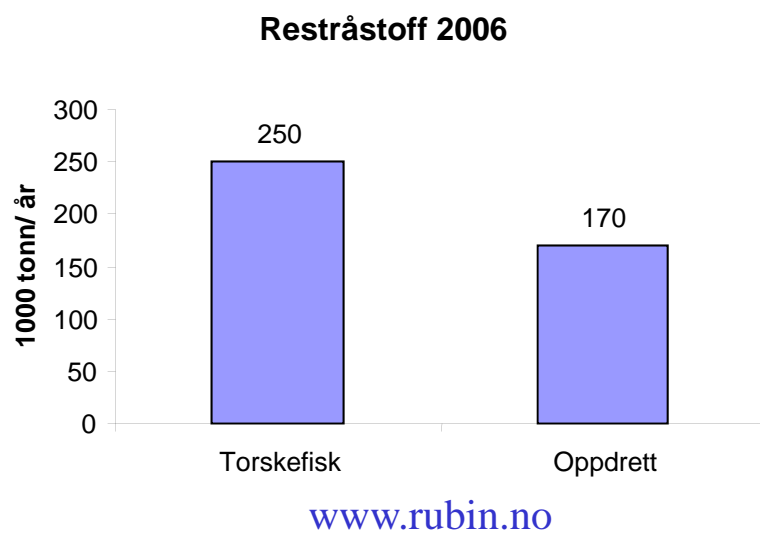


- Anbefalt protein inntak: 15 (10-35) energi%

## Diett protein og energi-omsetnad

- **Lavt** diett-protein aukar energi-omsetnad
- **Høgt** diett-protein aukar energi-omsetnad
- Kan proteinkjelder med ulik aminosyresamansetnad påverke energi-omsetnad ved **normalt** diett-protein?

## Fiskeprotein hydrolysat



Enzymatisk hydrolyse



Tørt fiske protein hydrolysat (FPH)

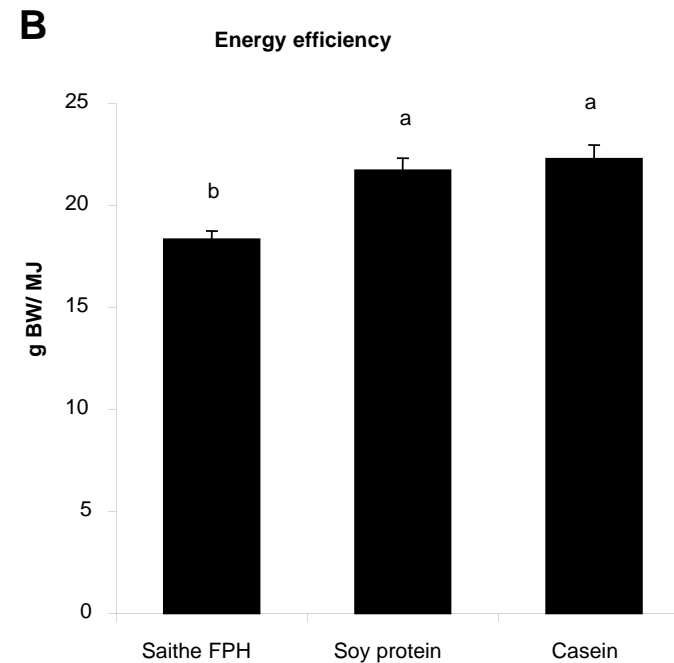
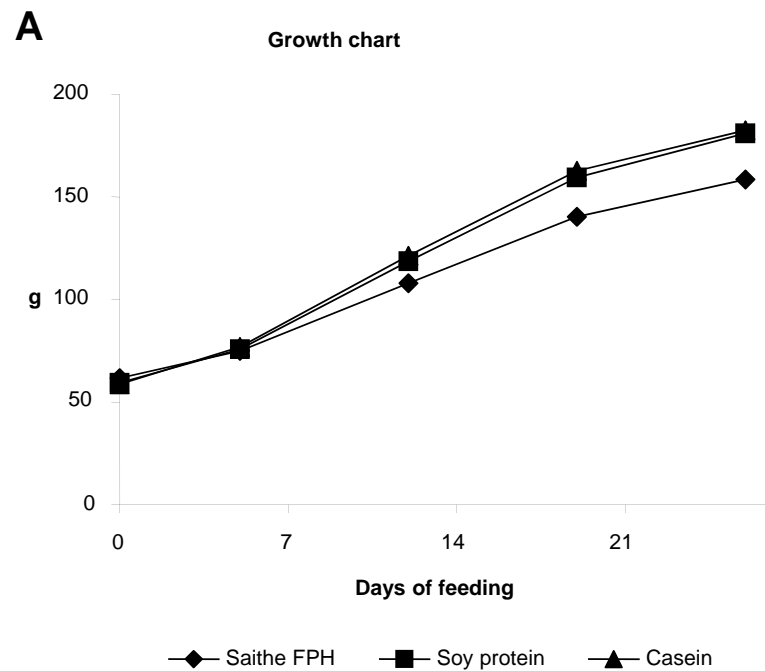


## Rotteforsøk med FPH frå sei

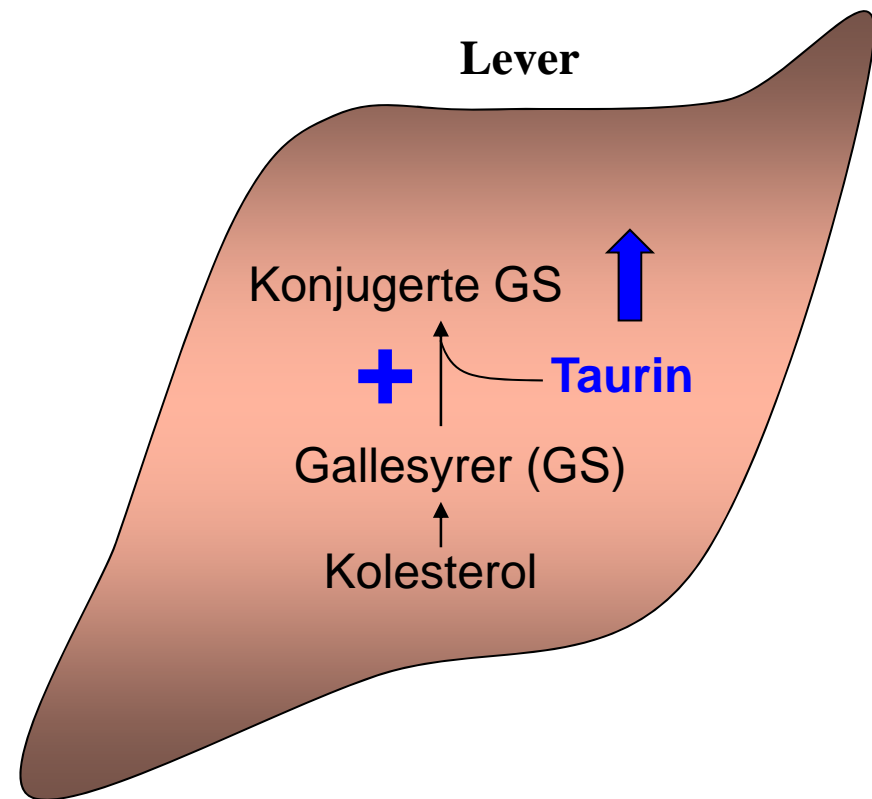
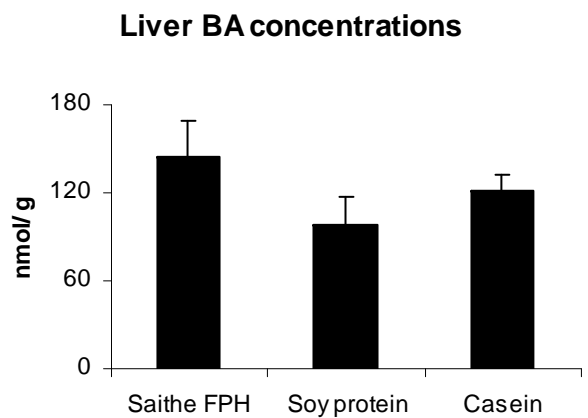
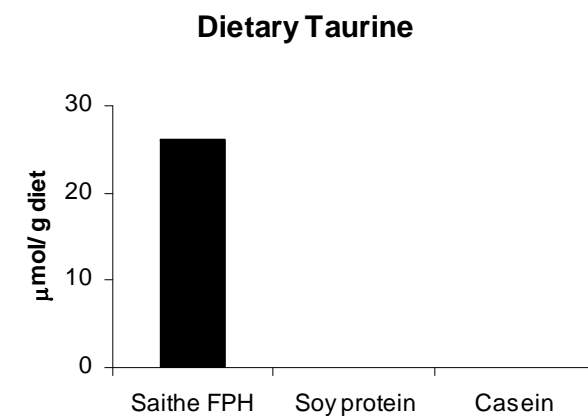
- Samanlikna sei FPH med effekt av soyaprotein og kasein

Component, g/kg	Saithe FPH	Soy protein	Casein
Saithe FPH	239	-	-
Soy protein isolate	-	230	-
Casein	-	-	227
KCl	-	23	26
Salt mix AIN-93 G*	35	35	35
Vitamin mix AIN-93G*	10	10	10
Cellulose	50	50	50
Sucrose	90	90	90
Supplement AIN-95G*	10	10	10
L-Cystine	3	3	3
Choline Bitartrate	2,5	2,5	2,5
Soy bean oil	100	100	100
Potato starch, dextrinized	461	447	446

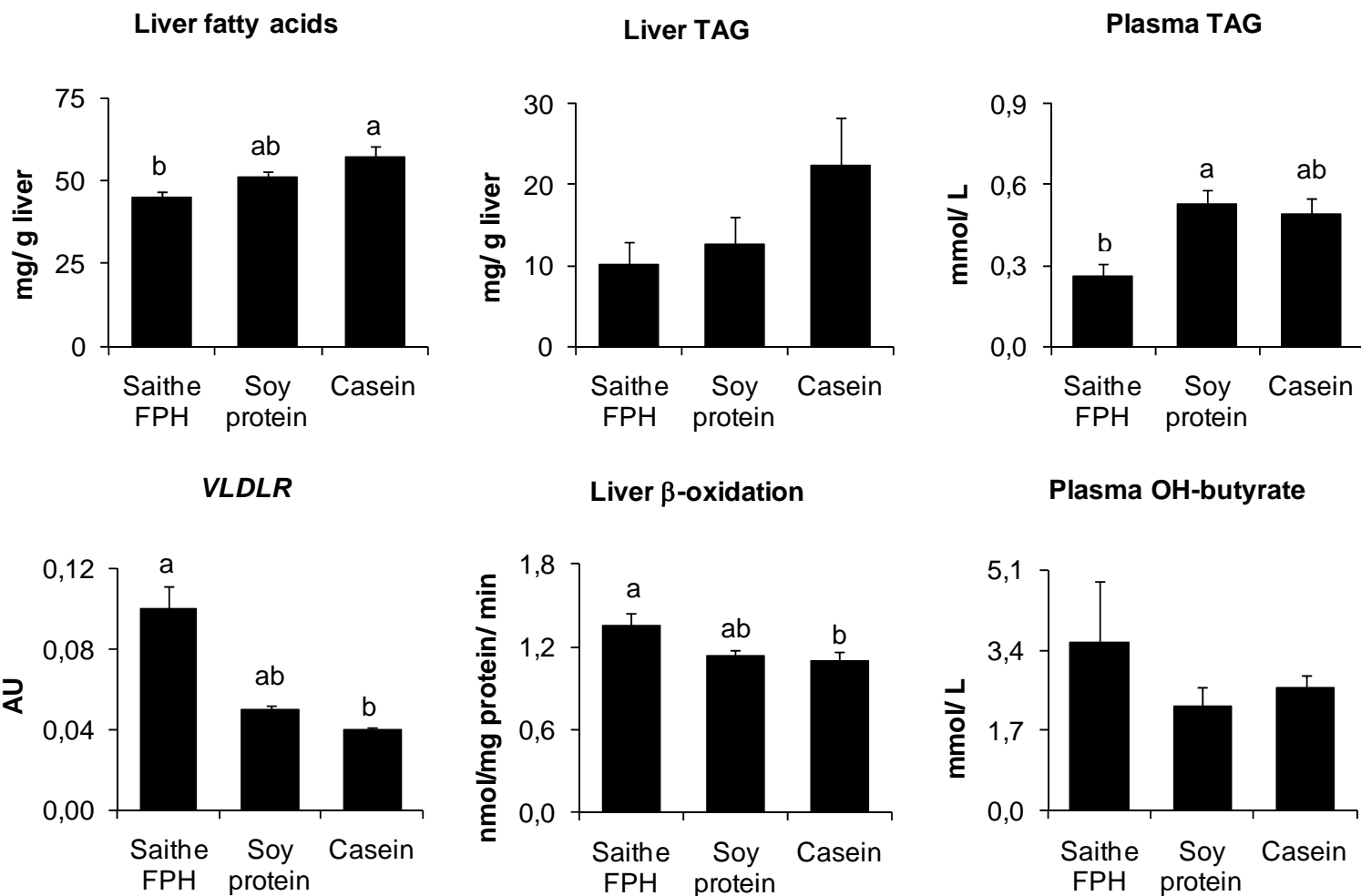
## Sei FPH reduserer energi-effektivitet



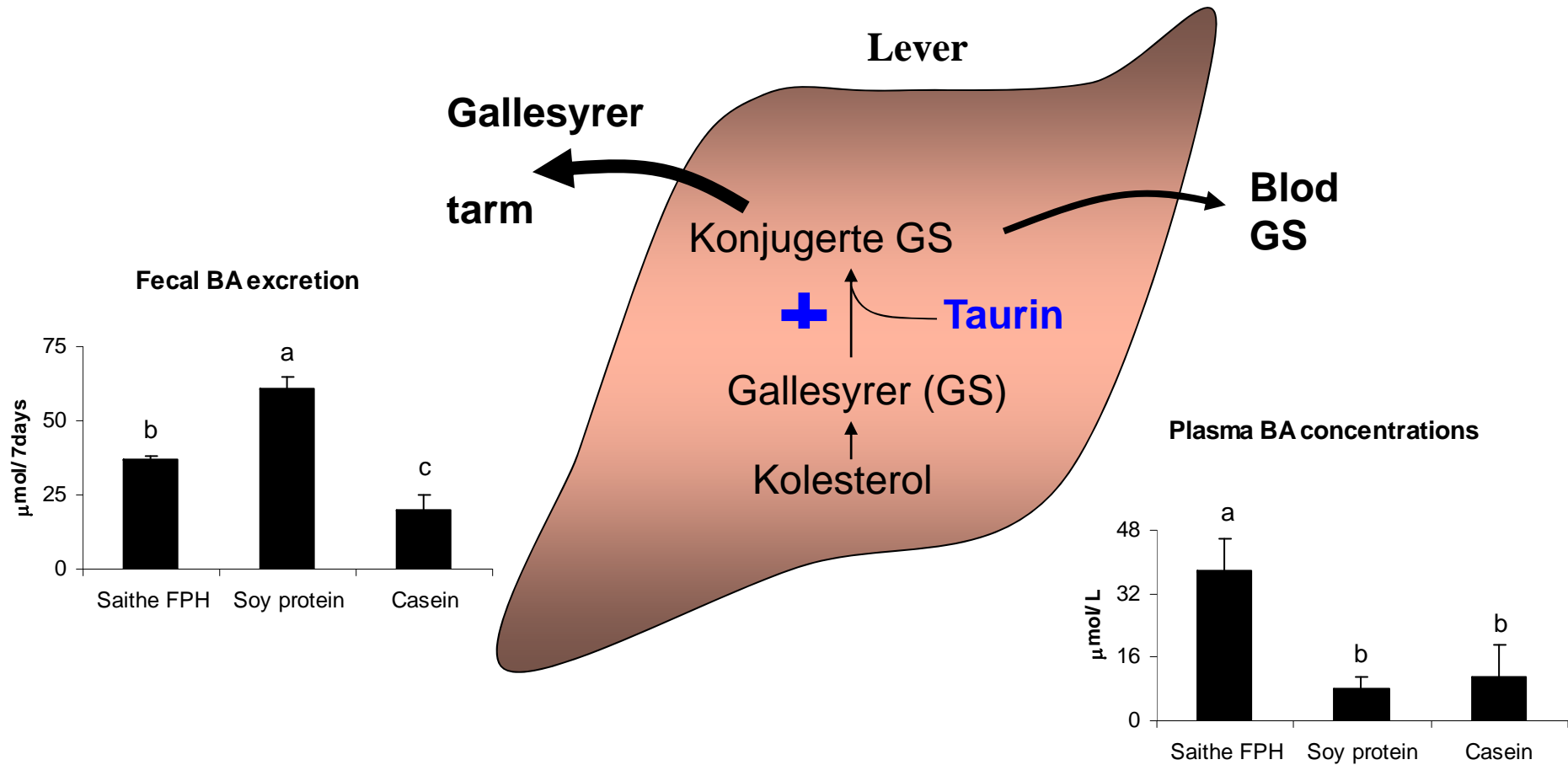
## Sei FPH er rikt på taurin – og taurin er involvert i galle syre-produksjon



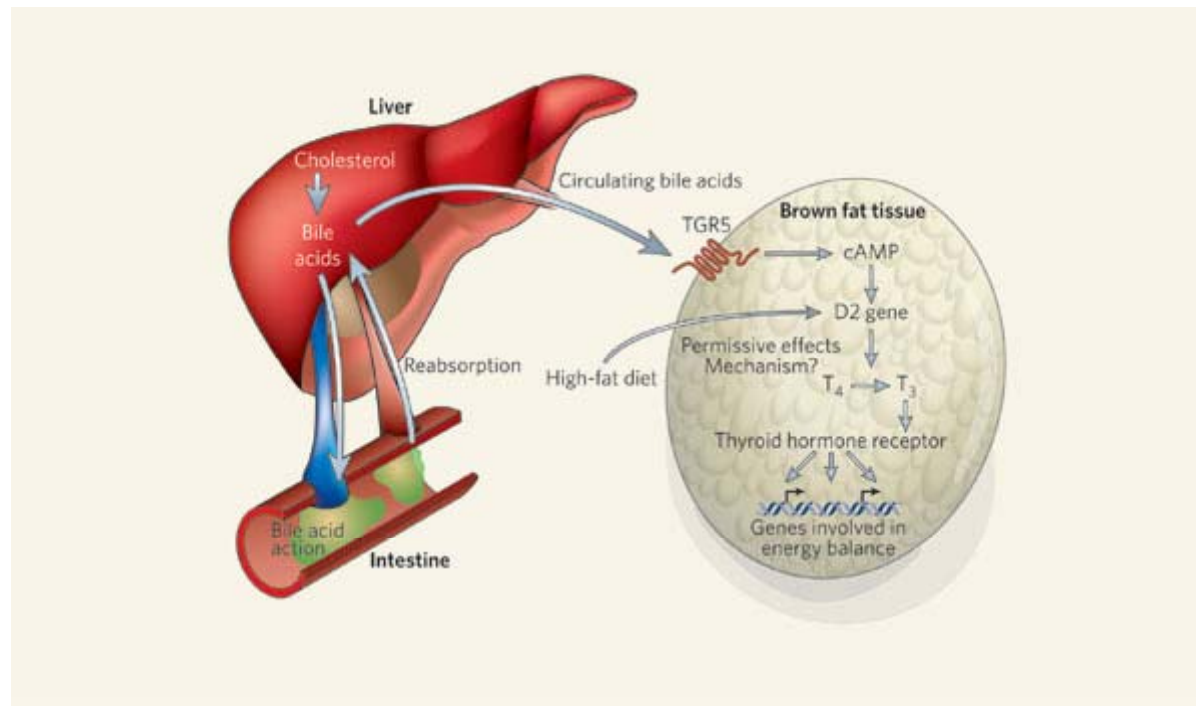
## Sei FPH reduserer TAG i lever og blod



# FPH aukar plasma konsentrasjon av gallesyrer

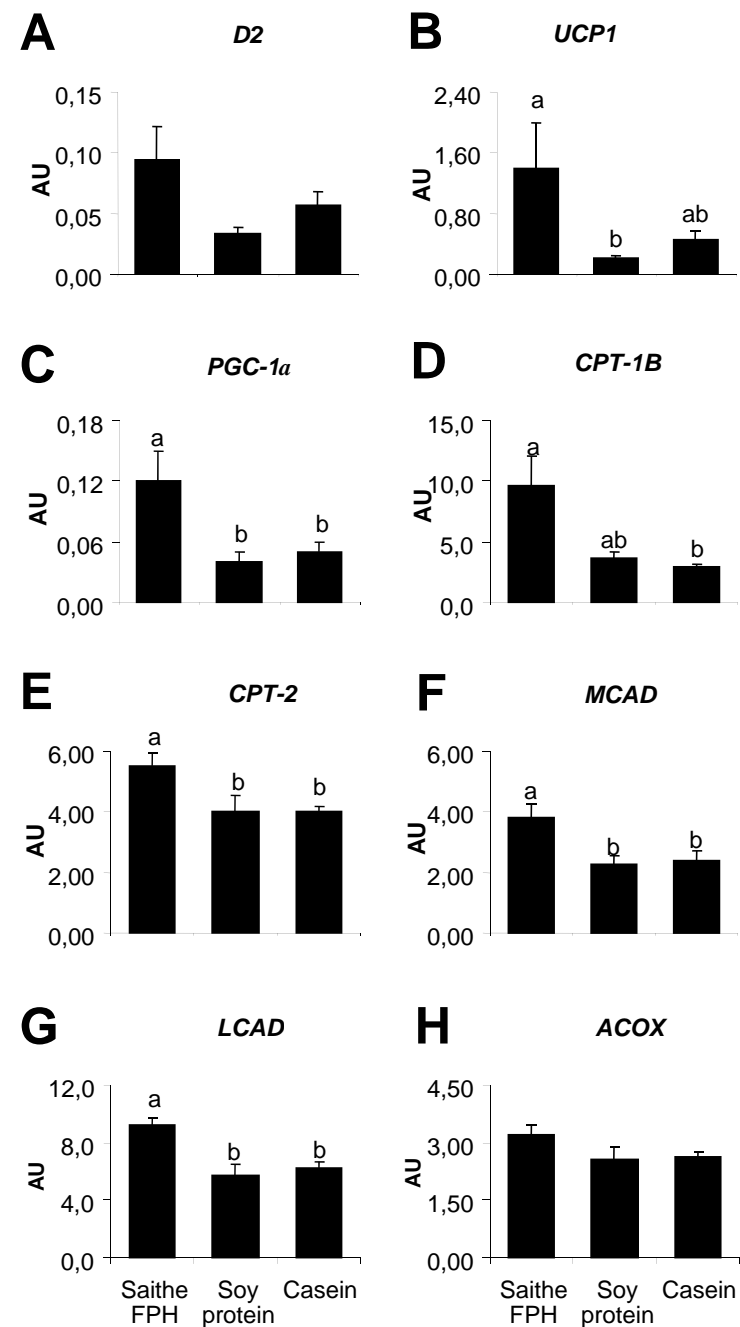
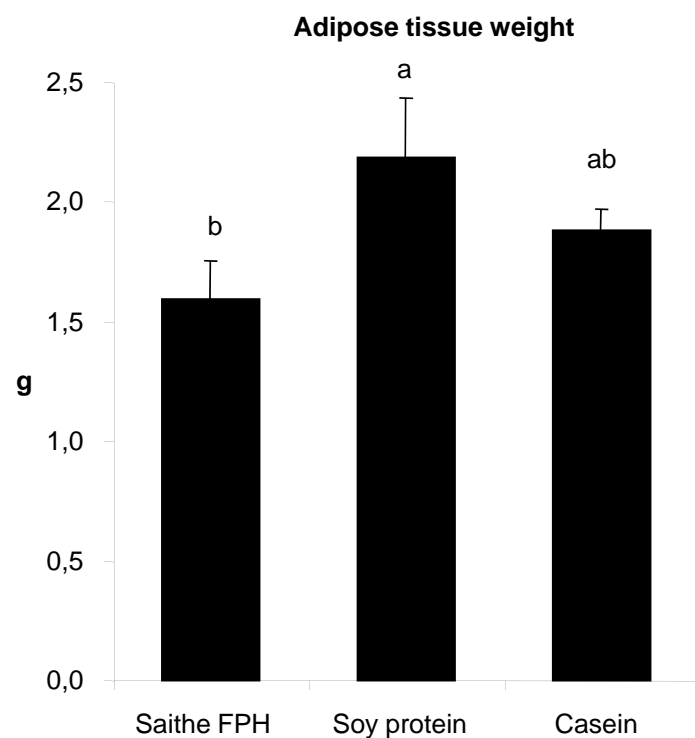


## Gallesyrer aukar energiomsetnaden fettvev

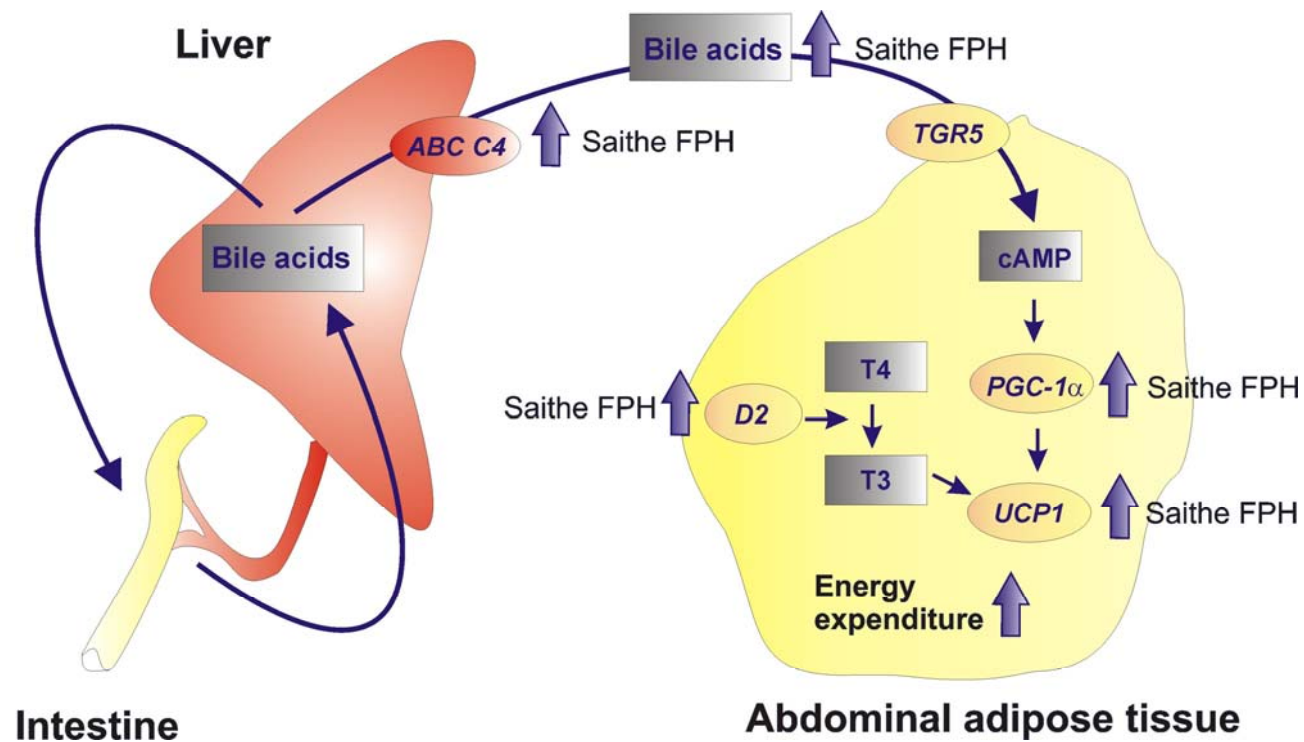


From Baxter, J.D. and Webb, P. (2006) *Nature* **439**: 402-403

## FPH reduserer mengde buk fett og endrar genuttrykk i buk fett



## Oppsummering FPH og redusert fedme





## Konklusjonar:

- Ved likt energi-inntak har rotter som får FPH i dietten:
  - **Redusert mengde buk fett**
  - **Lavare TAG i blod**
  - **Mindre fett i lever**
- FPH kan motvirke utvikling av metabolsk syndrom i rotter, samanlikna med soyaprotein og kasein

## FPH mot metabolsk syndrom

### Definitions for the Metabolic Syndrome

#### WHO 1999

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  - FPG ≥ 6.1 mmol/L

## Medarbejdere:

- Københavns Universitet
  - Qin Hao
  - Karsten Kristiansen
- Syddanske Universitet
  - Philip Hallenborg
- Universitetet i Bergen
  - Gunnar Mellgren
- Karolinska Universitetet
  - Hanns-Ulrich Marschall
- NIFES
  - Lise Madsen
  - Marit Espe
  - Gabriel Criales
  - Åse Heltveit
  - Jacob Wessels
  - Livar Frøyland

## Takk for økonomisk støtte frå:

- Rubin/ FHF
- Innovasjon Norge
- Danish Natural Science Research Council  
(Danish Obesity Research Centre)
- Programstyret for Ernæring, UiB

**Takk for merksemda!**



[1dak.com/people/biggest-beer-belly-in-the-world/](http://1dak.com/people/biggest-beer-belly-in-the-world/)