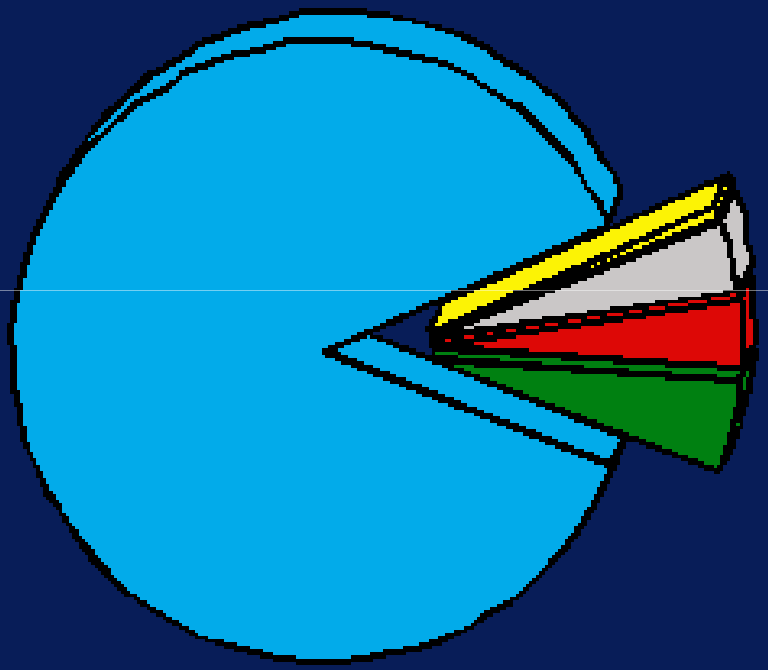
Milk composition of European breeds



	Average	Normal Variation
Water	87.2	82.4 - 90.7
Fat	3.5	2.5 - 6.0
Protein	3.2	2.7 - 4.8
Lactose	4.9	4.6 - 5.2
Minerals	0.7	0.6 - 0.8
Total solids	12.8	9.3 - 17.6

Milk fat syntheis

Glicerol

It comes mainly from glucose with a small contribution from triglycerides circulating in the blood stream;

Fatty acids

Short chain C_4-C_{14}

Udder synthesis starting from acetate e β-b-hydroxy-butyrate from rumen fermentations;

Long chain $\geq C_{16}$

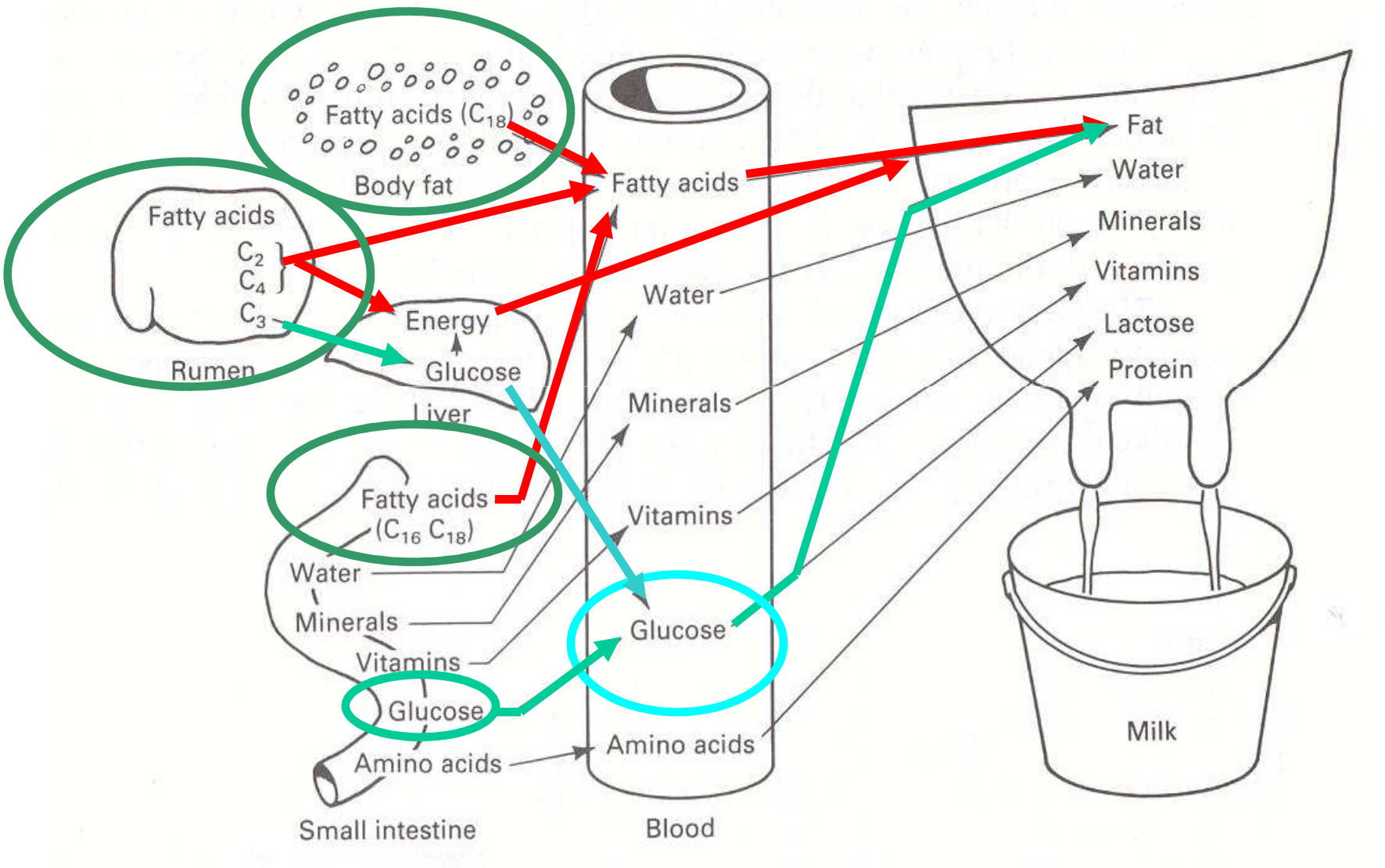
From feeding and mobilization of adipose reserves of the animal

Characteristics of butterfat in different species

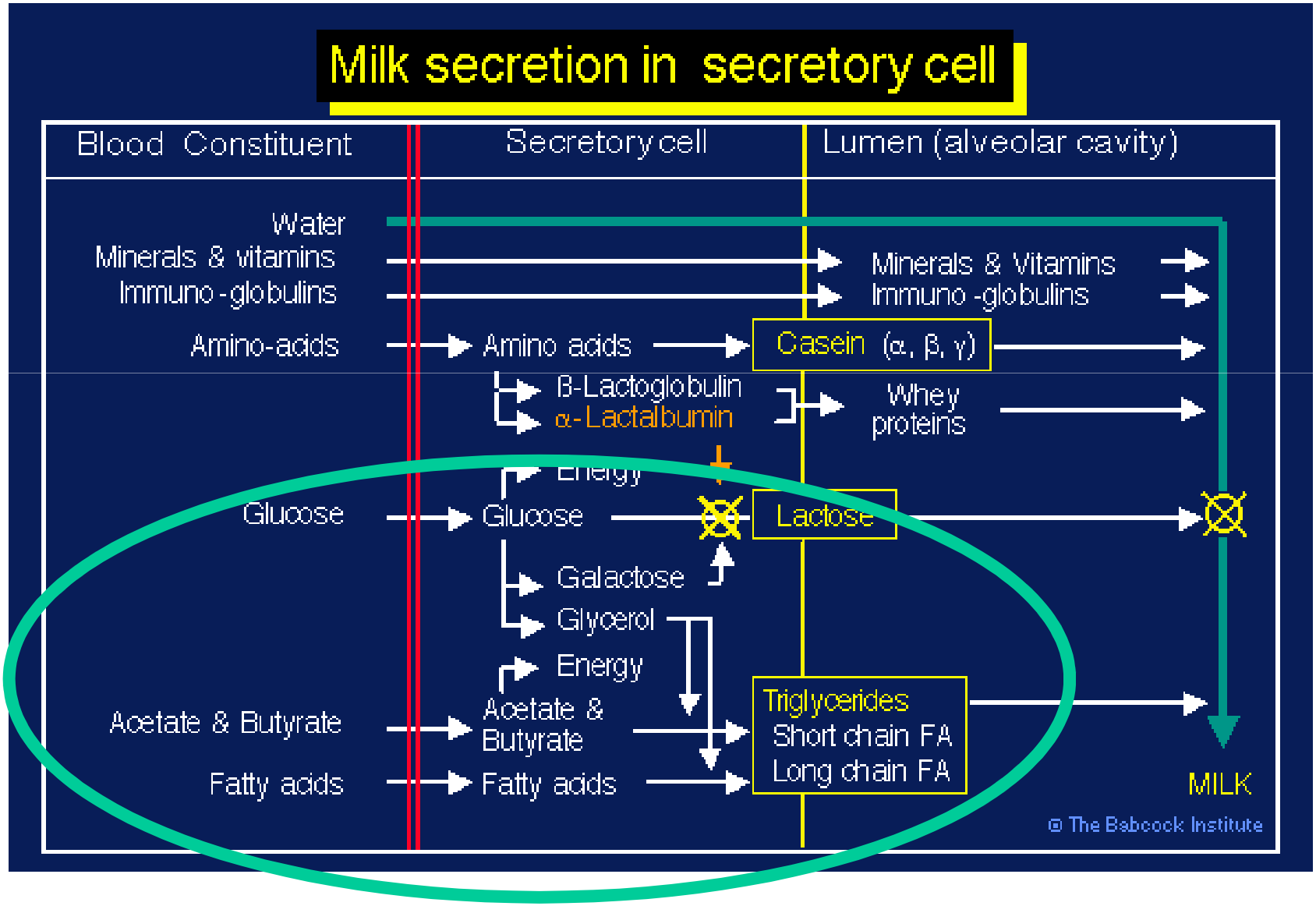
TABLE 4.1 PERCENTAGE OF FATTY ACIDS IN TRIGLYCERIDES OF MILK FAT

Fatty acid	Carbon length	Percent moles in triglycerides			
		Human	Pig	Goat	Cow
Saturated					
Butyric	4	—	2	7	10
Caproic	6	—	2	5	3
Caprylic	8	—	2	4	1
Capric	10	2	2	13	2
Lauric	12	8	2	7	3
Myristic	14	9	2	12	9
Palmitic	16	23	29	24	21
Stearic	18	9	6	5	11
Unsaturated					
Oleic	18:1	34	35	17	31
Linoleic	18:2	7	14	3	5
Other	—	8	12	3	4

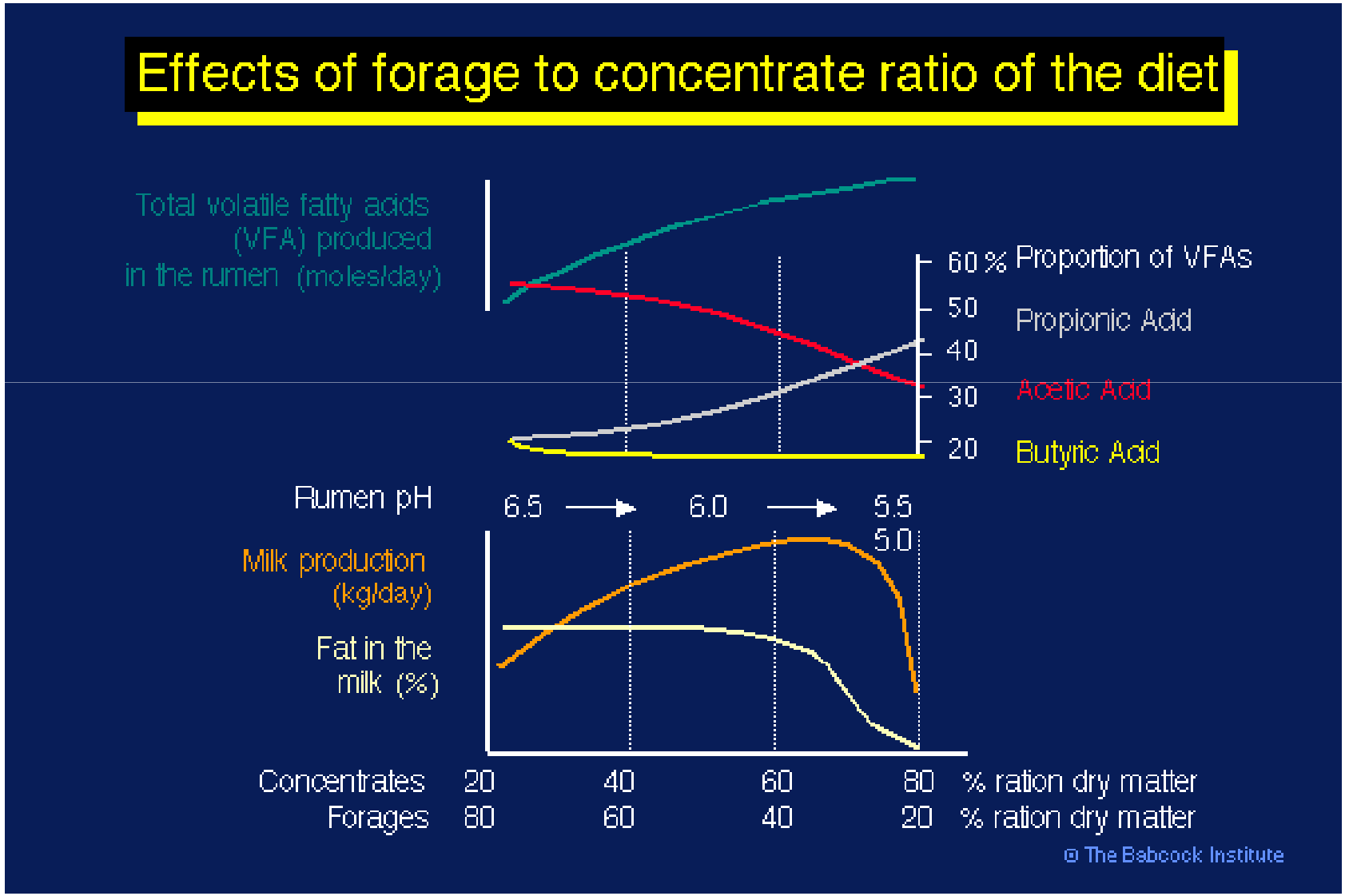
Butterfat synthesis - 1



Butterfat synthesis - 2



Relatioship between diet composition and milk



Milk protein synthesis

Sources

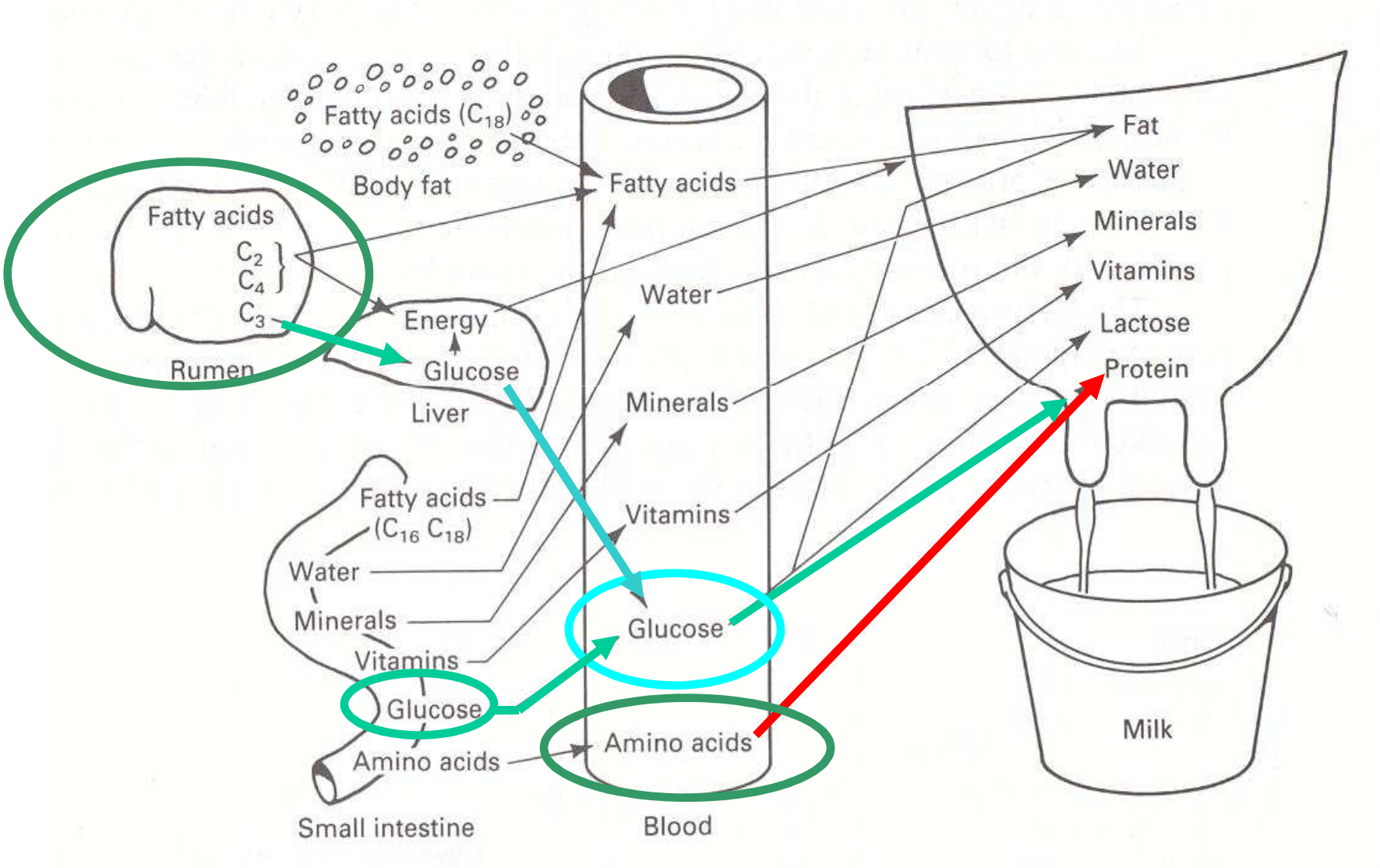
- **Rumen bacteria 60/70%;**
- ***by-pass* Proteins;**
- **Body reserves;**

Synthesis

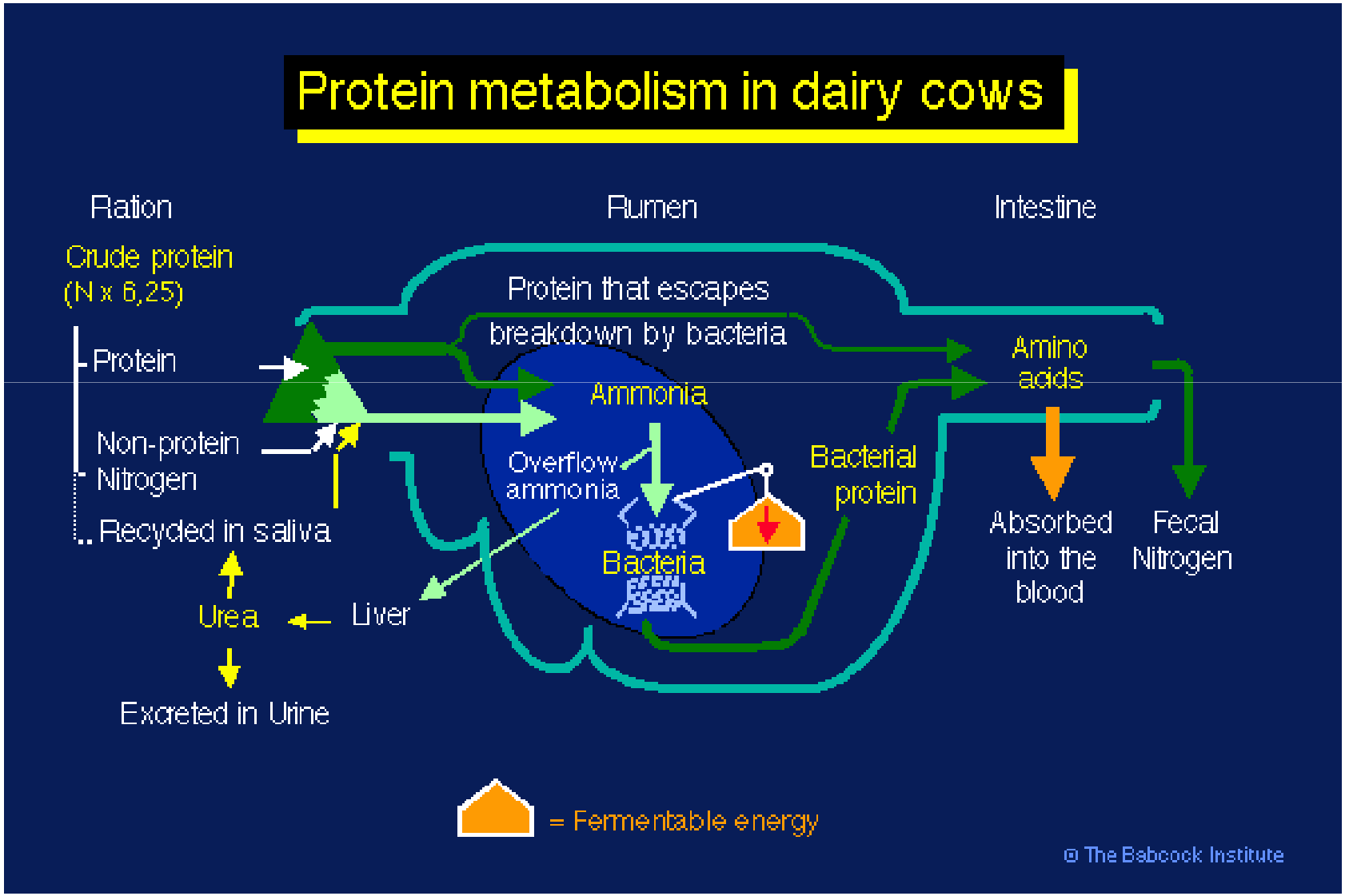
- **Casein (80% of CP), lactoalbumin e lactoglobulin**
  Synthesized by the udder from aminoacids and glucose supplied by the blood.

- **Serum albumin e serum globulin**
  Synthesized by the liver and they come directly from blood serum proteins

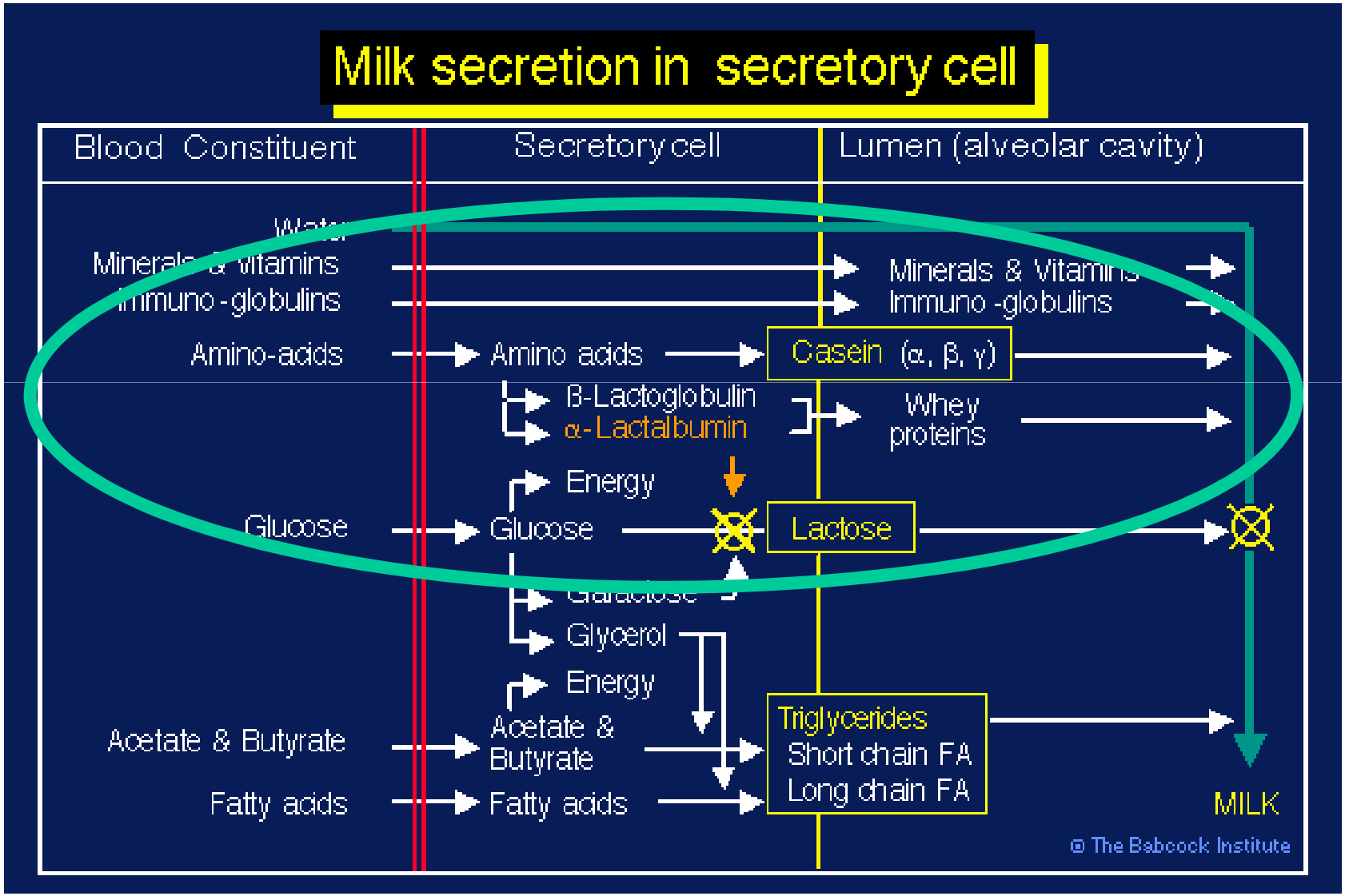
Milk protein synthesis



Milk protein synthesis



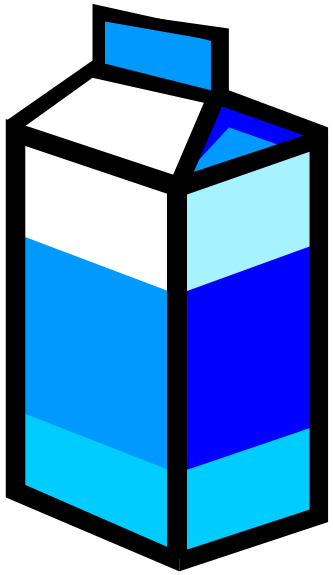
Milk protein synthesis



Lactose

☛Milk sugar made of galactose e glucose

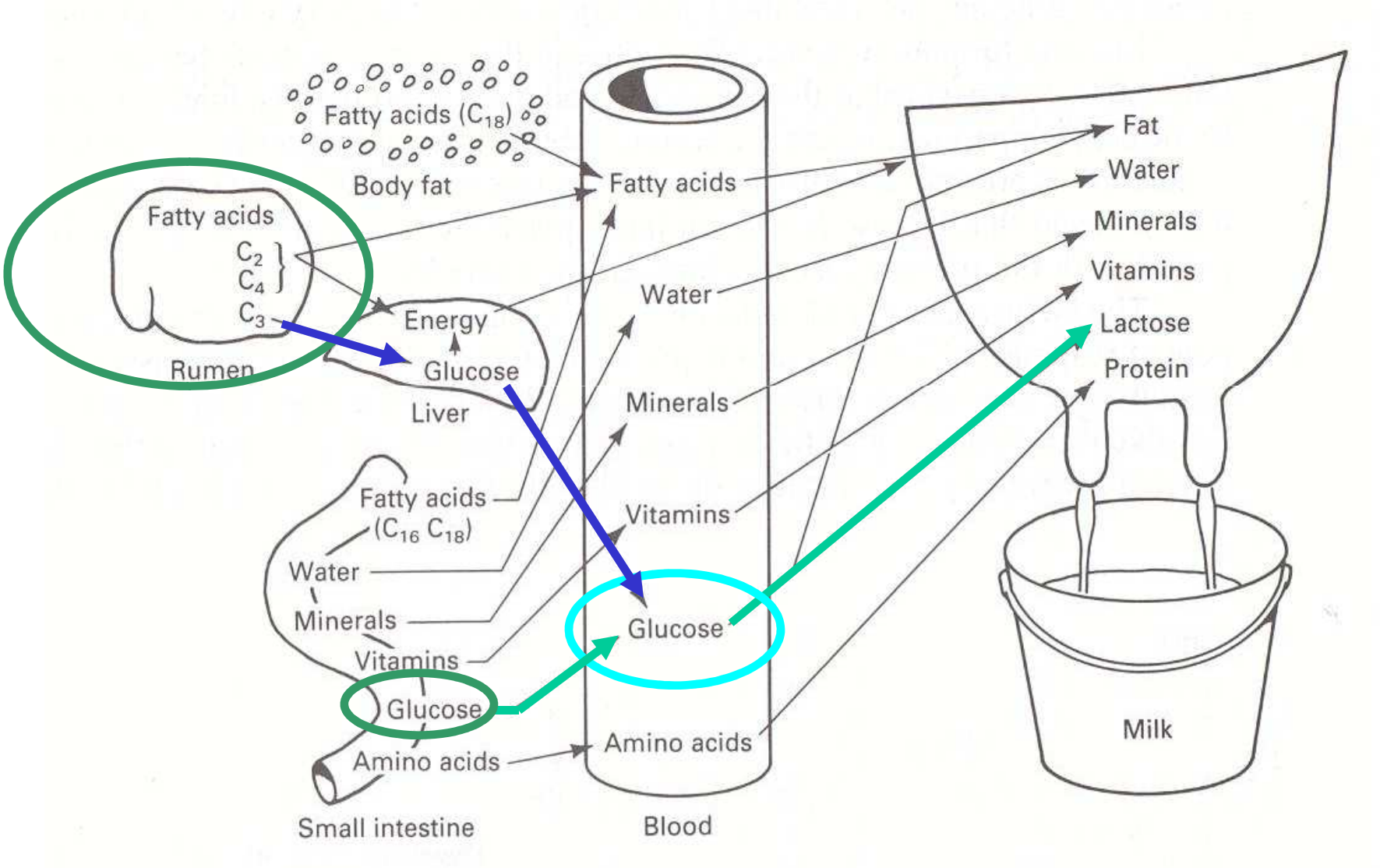
☛about 5 %
☛It is the main constituent of solid non fat (SNF)



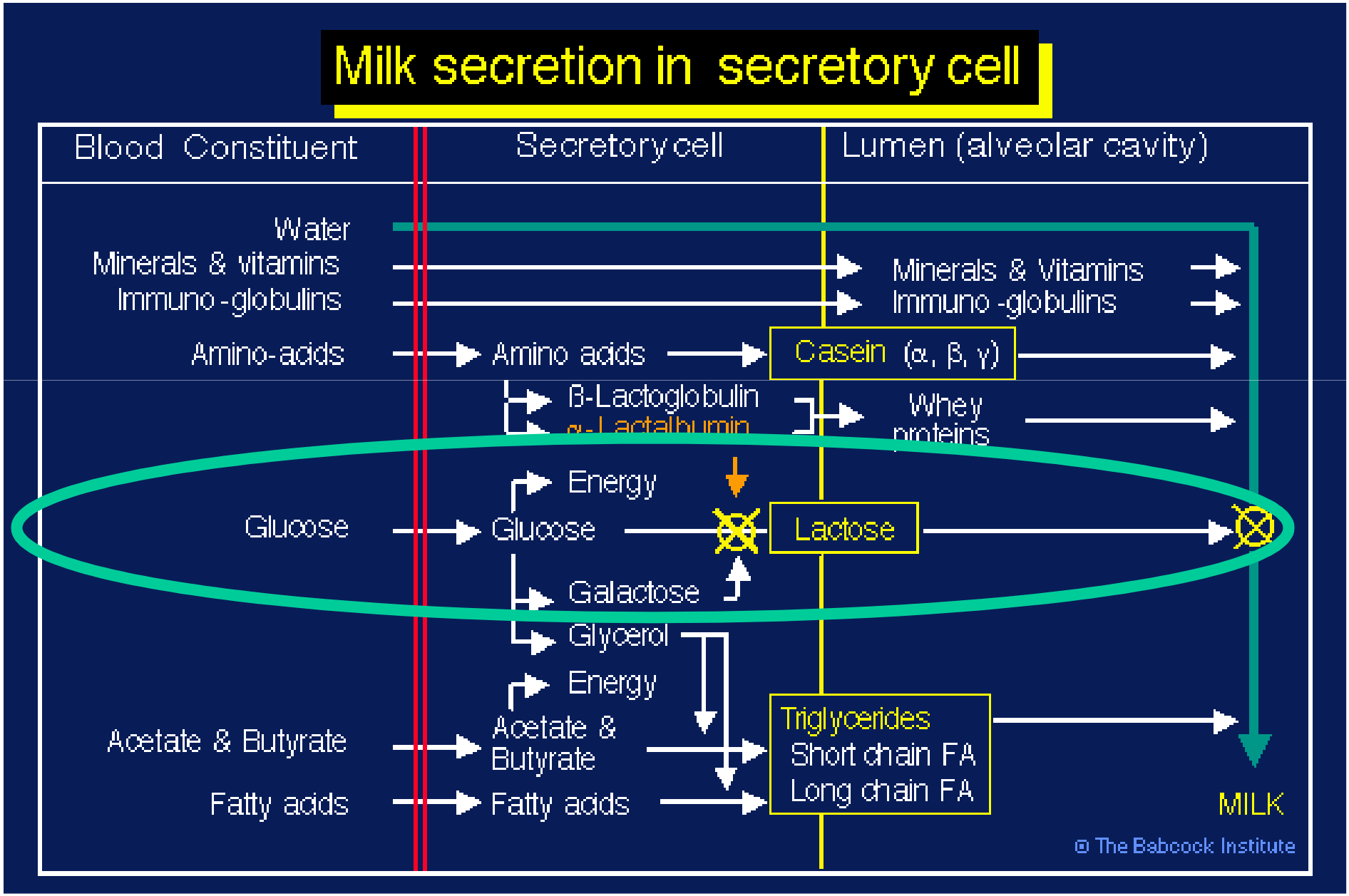
Low concentration usually means bad conservation

Concentration varies with udder problems

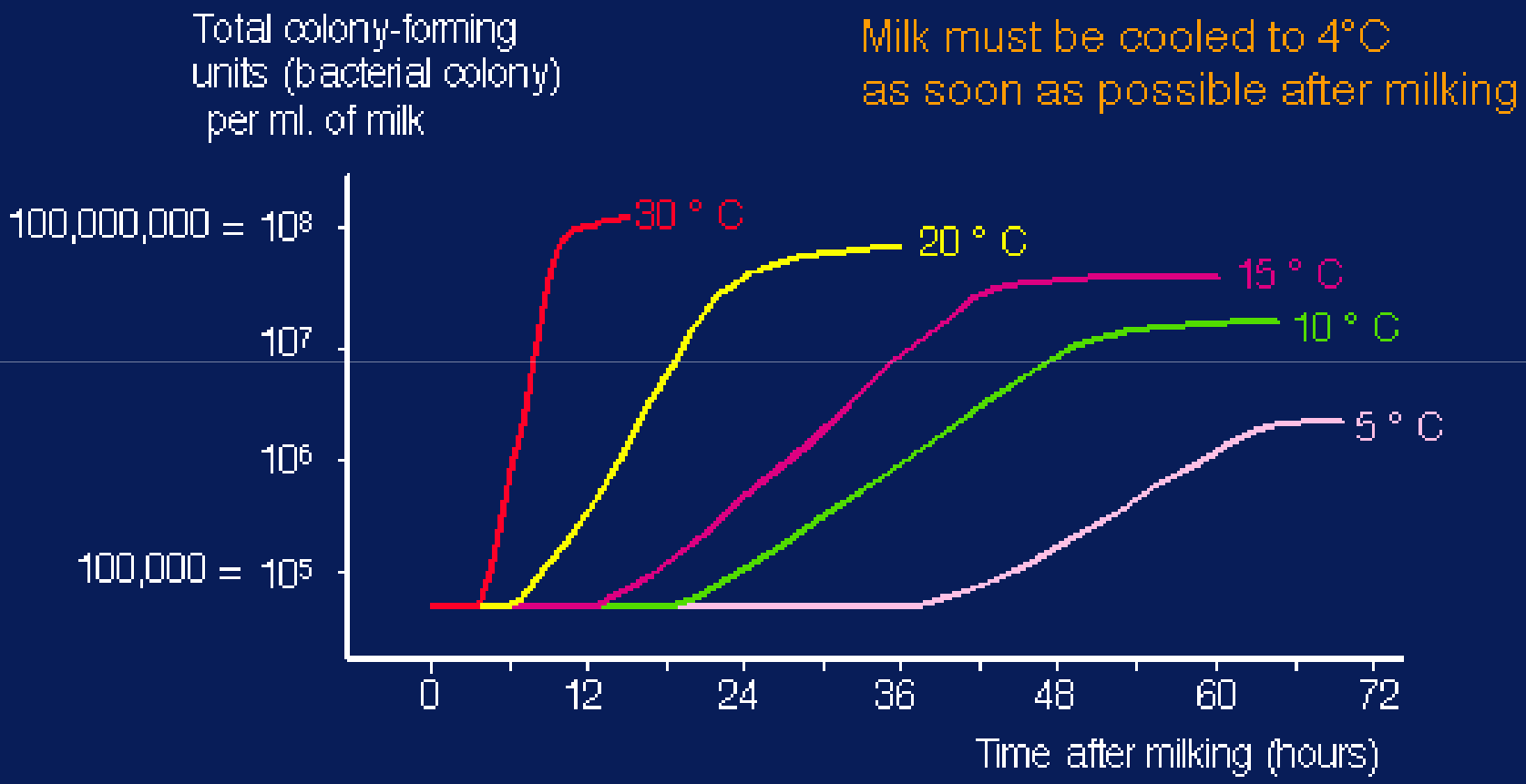
Lactose synthesis - 1



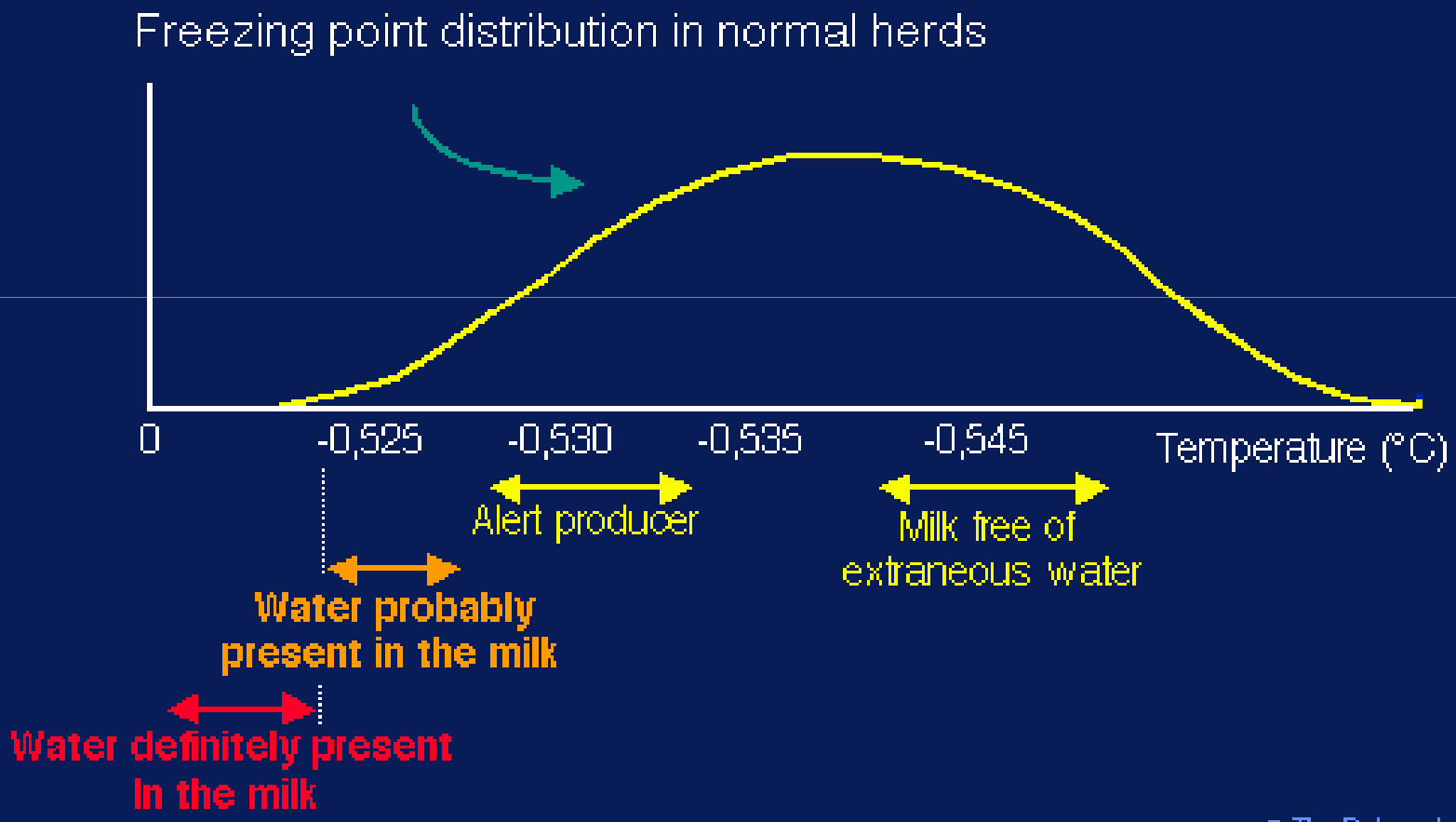
Lactose synthesis - 2



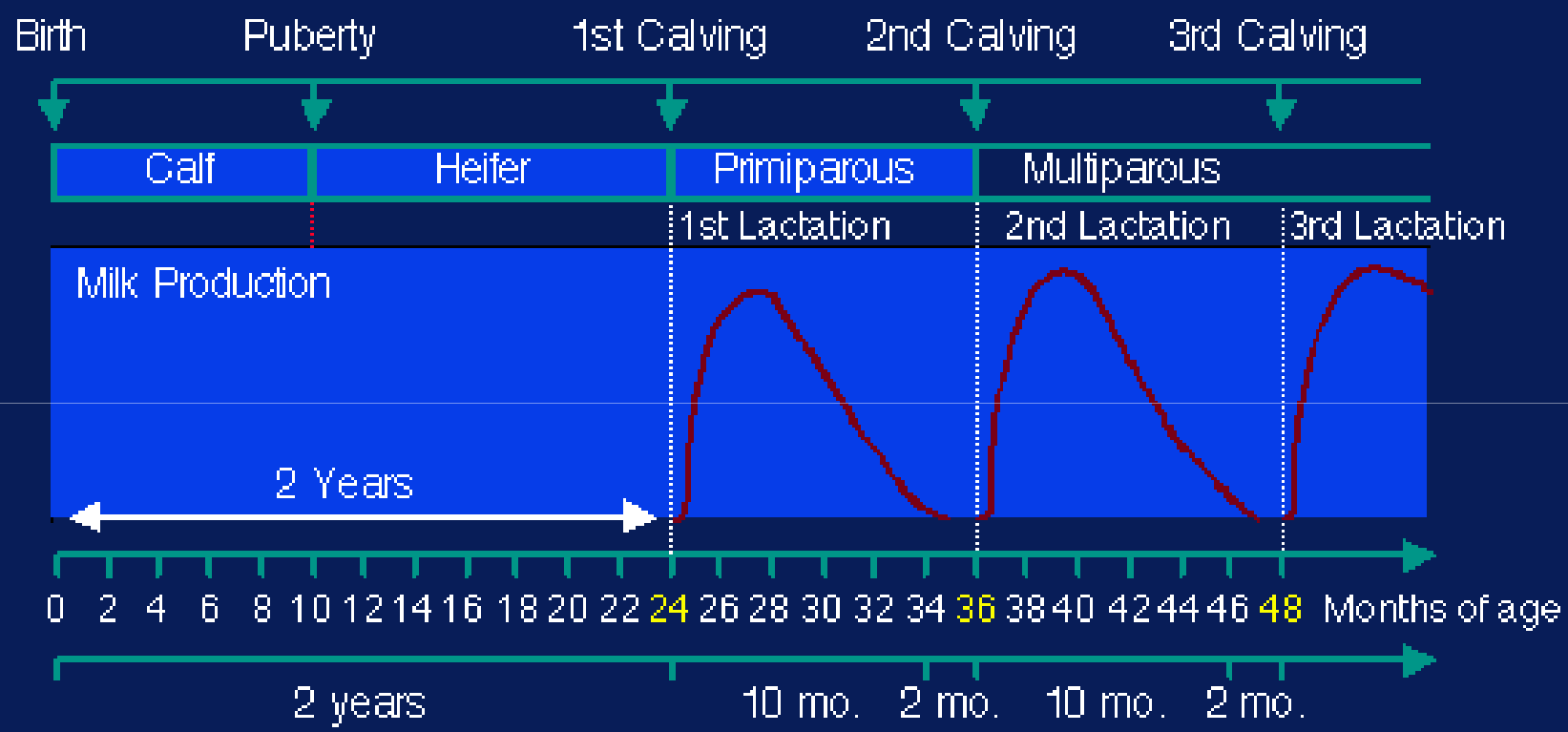
Bacterial growth and milk temperature



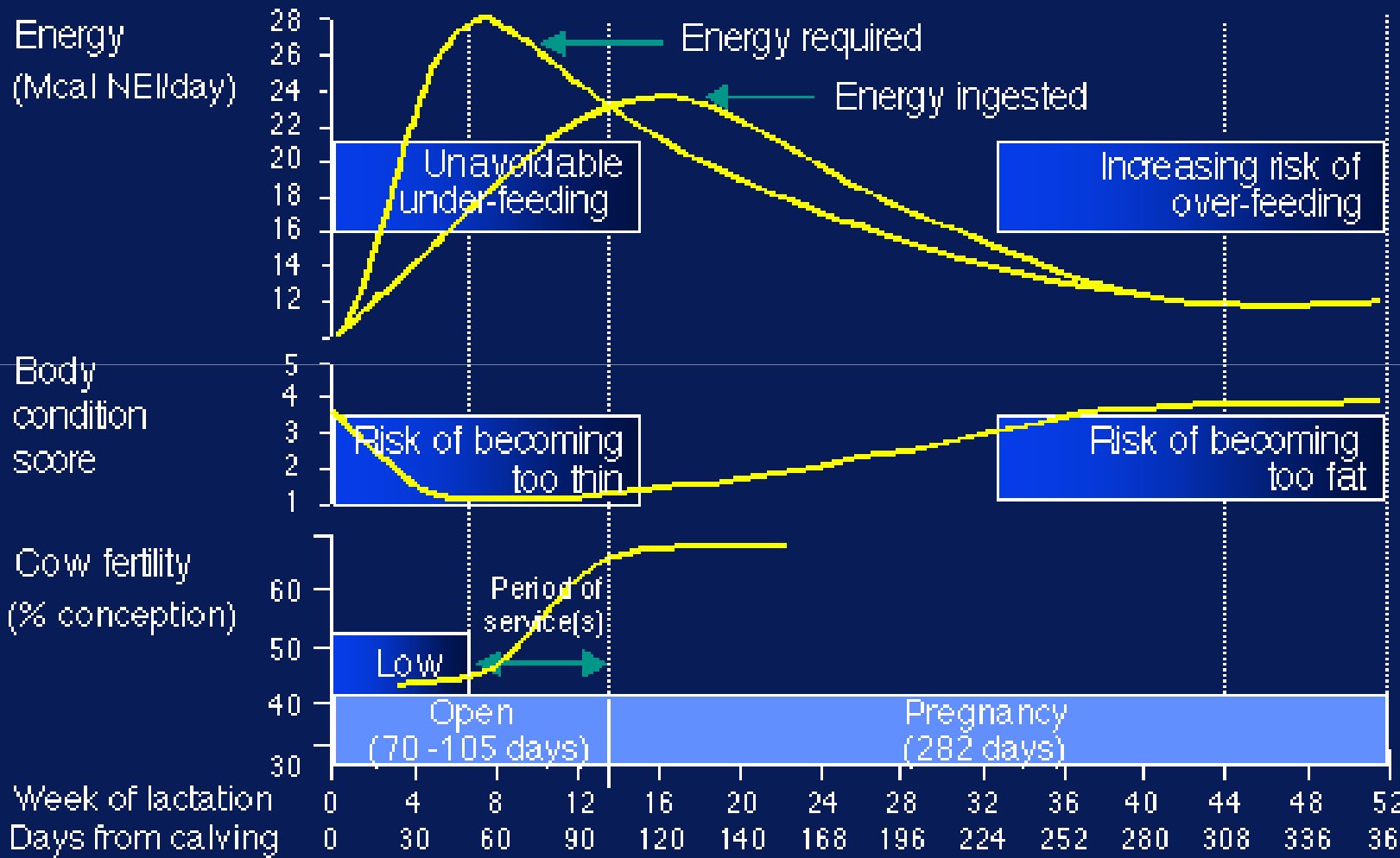
Freezing point to predict water contamination



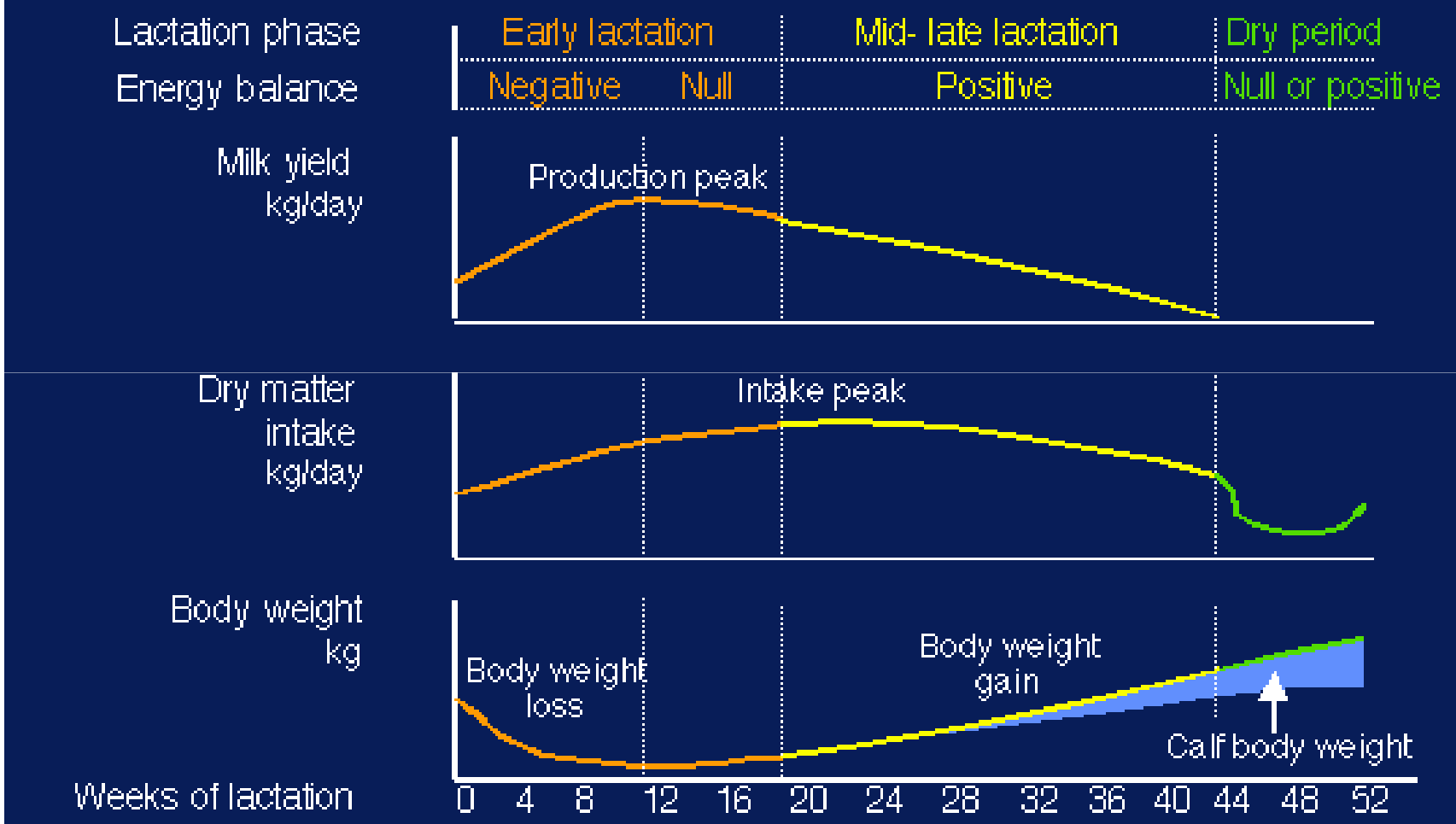
Lactation cycles



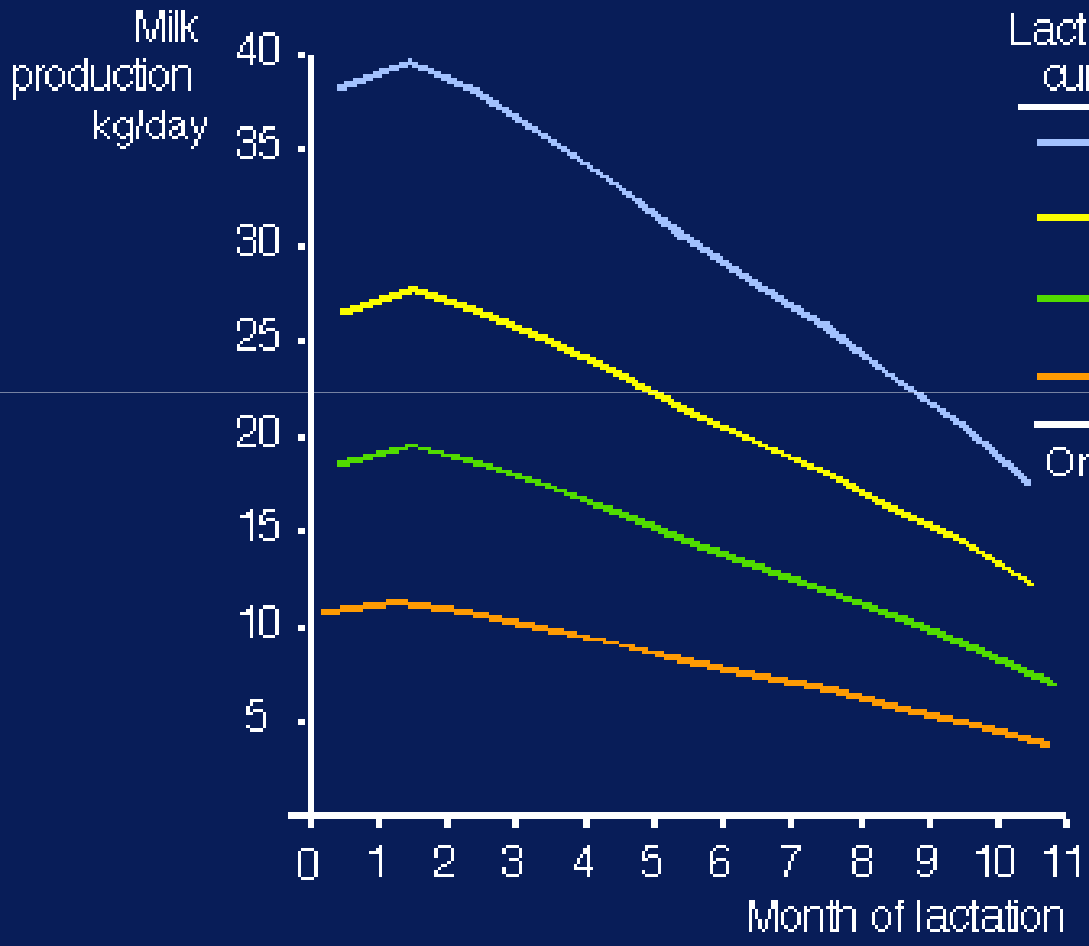
Energy balance, body condition score and fertility



Phases of a lactation cycle



Peak and lactation performance



Lactation curve	Peak lactation kg/day	Lactation performance kg
	40	10000
	28	7000
	20	5000
	12	3000

One additional kg of milk at peak equals 200 kg more milk for the lactation.

Change in milk composition during lactation