



Discovery of new α_{S2} -CN phosphorylation isoforms suggests 2 phosphorylation pathways



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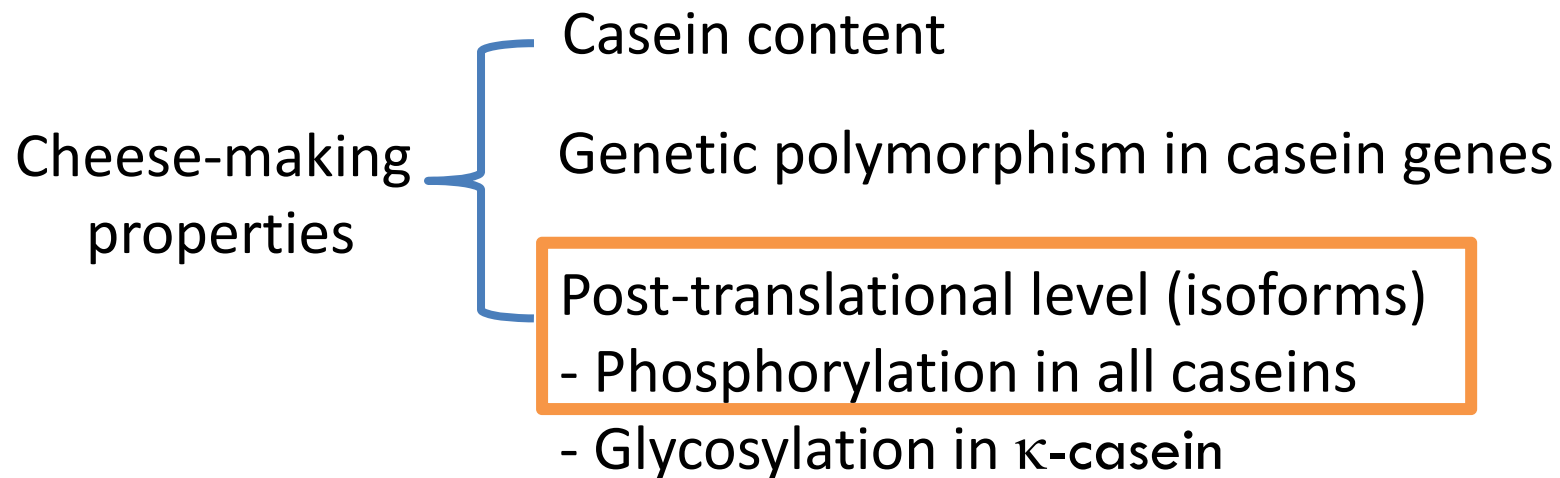
Acknowledgment

This study was part of the FROM'MIR project

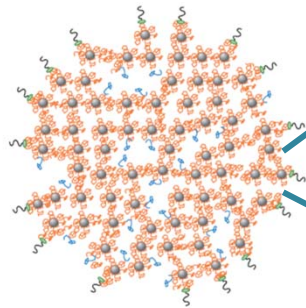


Why we are interested in milk protein composition?

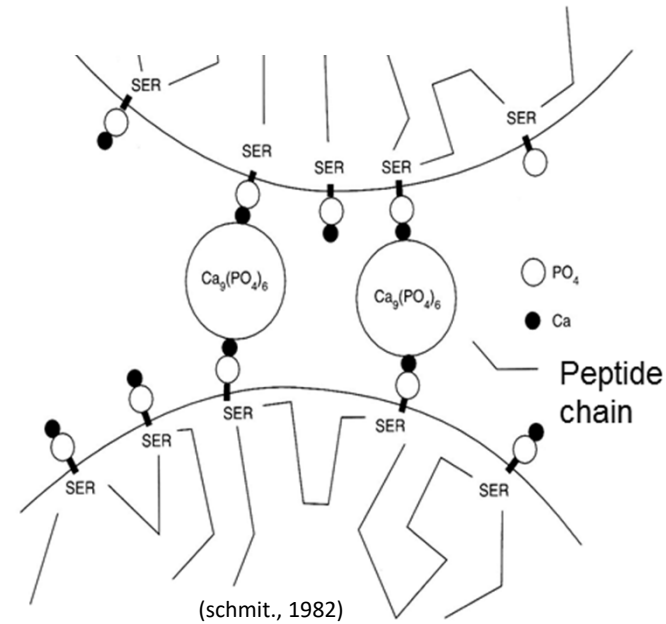
- Dairy products (especially cheese)



Casein micelle structure



(Dagleish *et al.*, 2012)



(schmit., 1982)

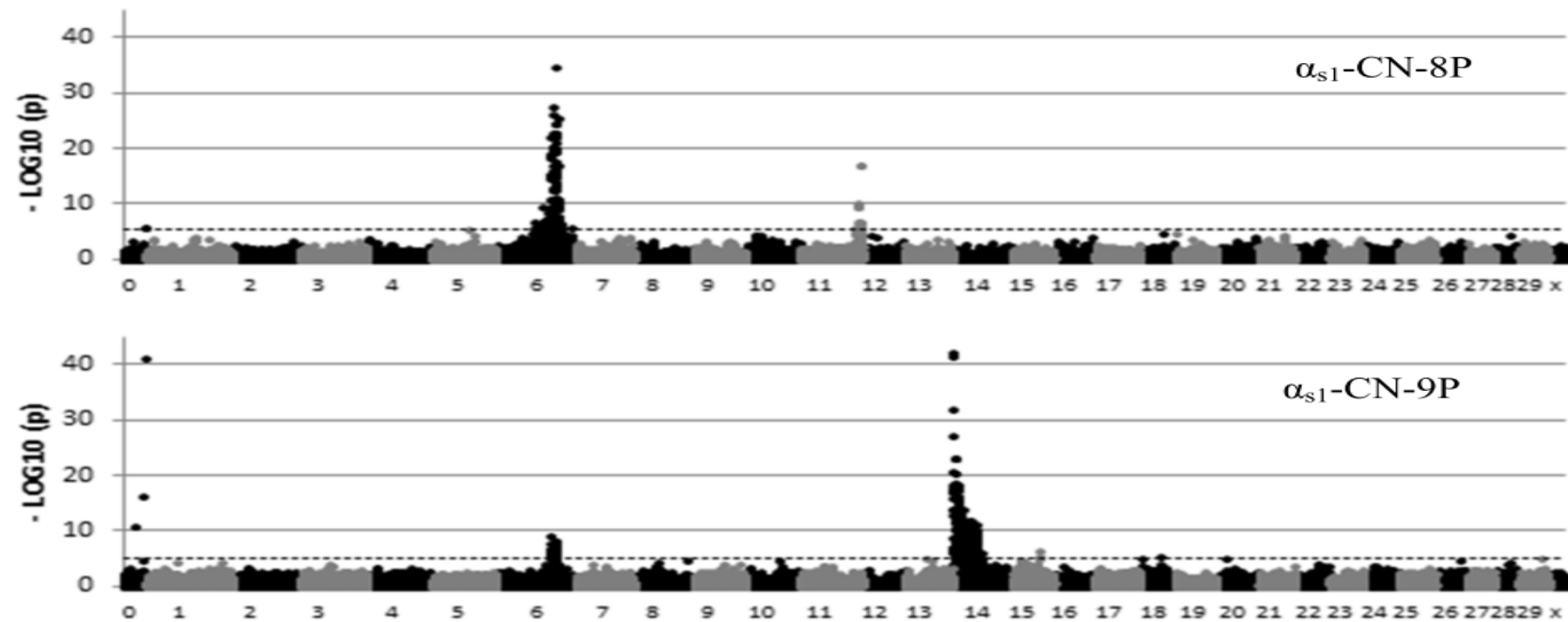
Phosphorylation of caseins $\xrightarrow{?}$ Micelle structure \longrightarrow Milk technological properties

At post-translational level in bovine milk

Caseins	α_{s1}	α_{s2}	β	κ
Proportion	40%	10%	40%	10%
Potential Phosphorylation site	10	18	6	6
Observed	8-9P	10-13P	5P	1P

Genome-wide association study on α_{s1} -CN isoforms

(Dutch milk genomics initiative; Bijl et al., 2014)



Objective

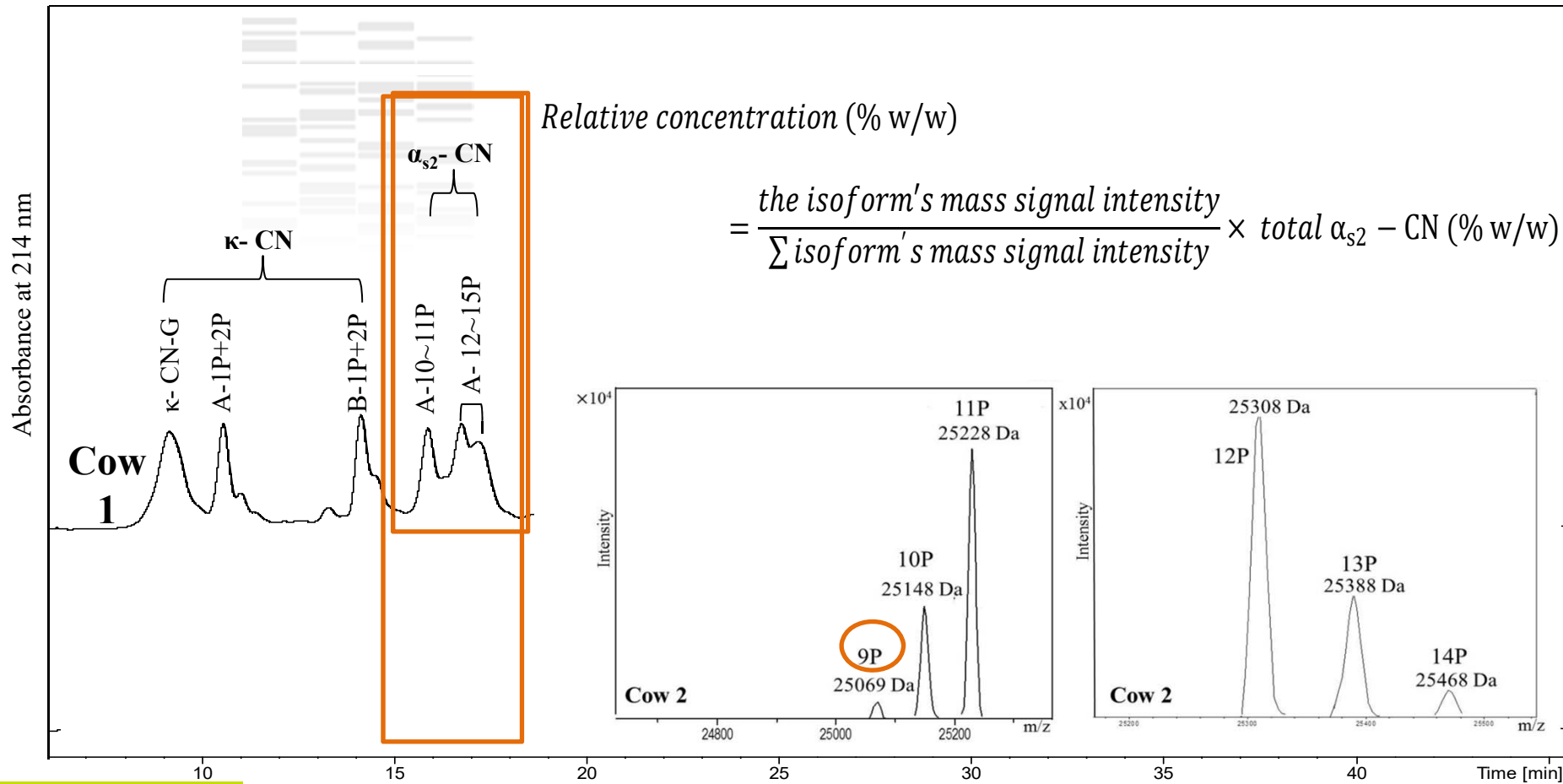


- Study variation in phosphorylation degree of α_{s1} -CN and α_{s2} -CN
 - Estimate the relations among α_{s1} -CN and α_{s2} -CN phosphorylation isoforms
- Are different isoforms genetically different traits ?

Materials and Methods

- 531 morning milk samples from French Montbéliarde cows
- Liquid Chromatography coupled with Mass Spectrometry (LC-MS)





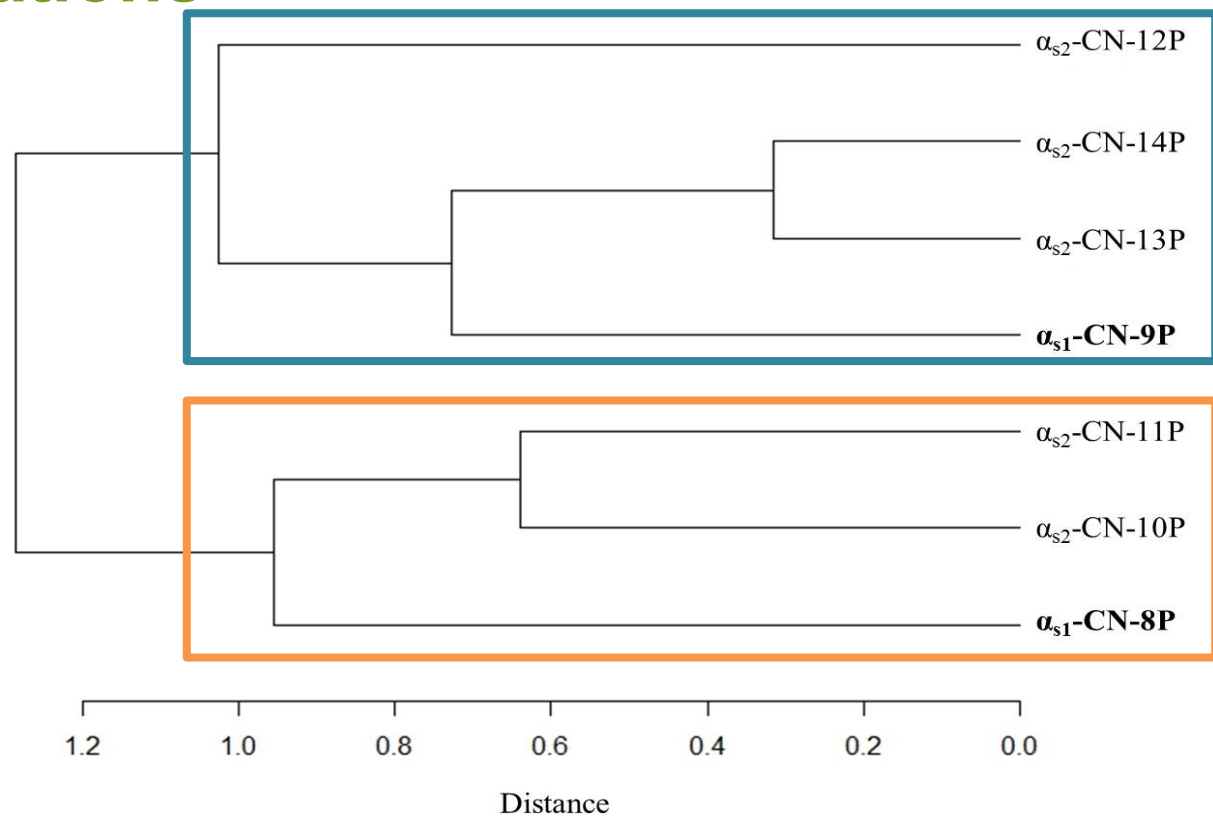
Descriptive statistics

	Trait	Mean (%w/w)		CV
α_{s1} -CN	total	32.9	7	
	8P	25.3		8
	9P	7.6		13
α_{s2} -CN	total	8.2	11	
	9P	0.2		21
	10P	0.7		42
	11P	3.1		18
	12P	2.7		13
	13P	1.6		20
	14P	0.4		36
15P	0.2		49	

Visualize correlations




2 main groups



Take-home messages

- 3 new α_{s2} -CN phosphorylation isoforms

 α_{s2} -CN-9P
 α_{s2} -CN-14P
 α_{s2} -CN-15P

- Two main regulatory systems for α_s -CN phosphorylation
 - Lower degree of phosphorylation
 - Higher degree of phosphorylation