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Better knowledge for colostrum production and transfer of passive immunity in sheep

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CIIRPO

FEDATEST

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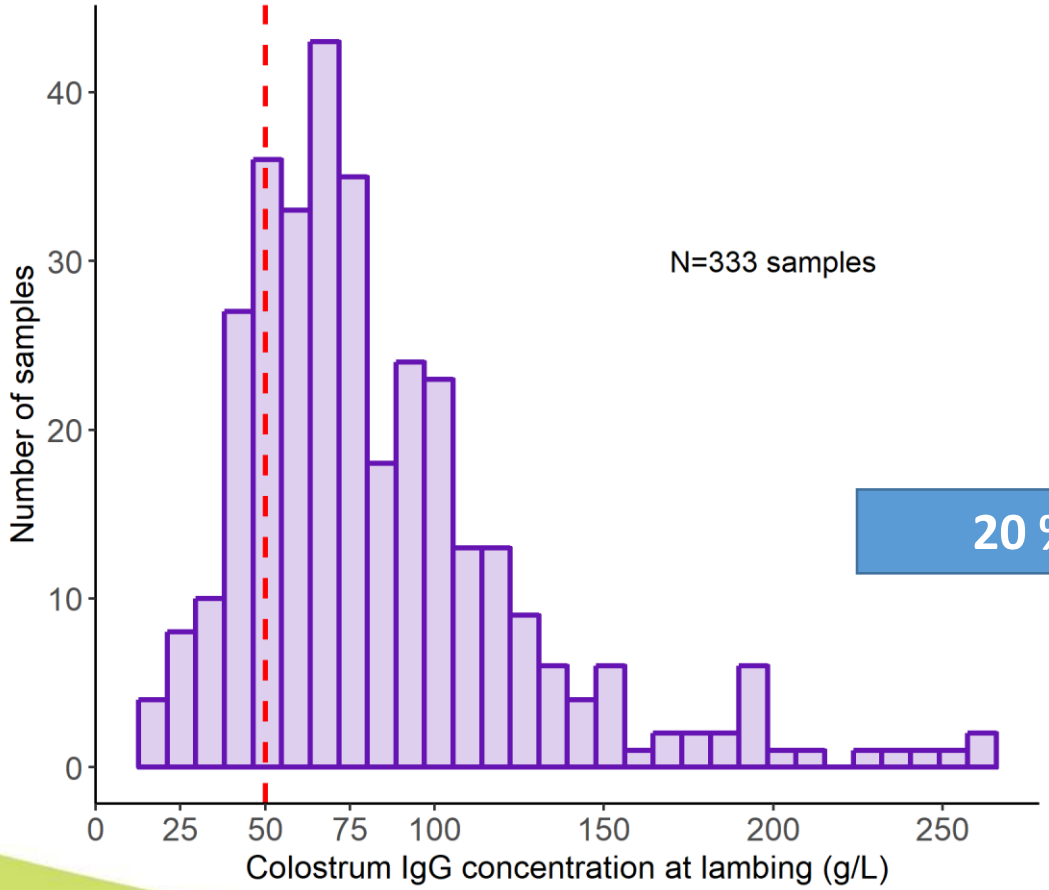
Material and methods

- Colostrum production
  - 333 ewes (BMC + Noire du Velay + Lacaune)
  - Milked at T0, +6h, +12h, (+18h) after lambing (1/2 udder)

- Transfer of passive immunity
  - 109 lambs
    - maternal suckling, sampled at 48h, survival up to 40 days
  - 38 triplet lambs
    - artificially fed with dam fresh colostrum at 0, 6, 12 hours and sampled at 0, 6, 12, 48 h

- Laboratory analysis
  - Radial immunodiffusion assay (IgG)
  - Gerber method (Fat)

Colostrum [IgG] at lambing

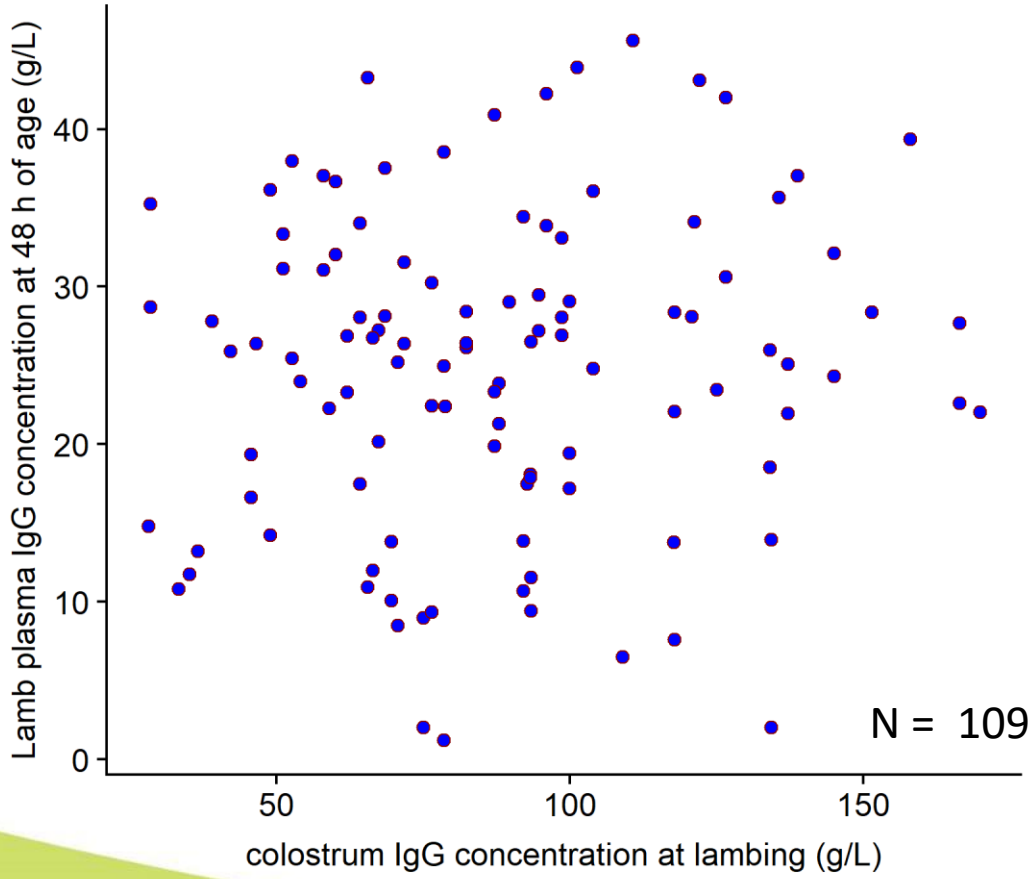


- 1st quartile : 54.7 g/L
- Median : 83.8 g/L
- 3rd quartile : 102.2 g/L

20 % with colostrum [IgG1]< 50 g/l

Breed x Lambing rank : p = 0.02
BCS : p = 0.004
Litter size : p = 0.02
Season : p = 10^{-9}

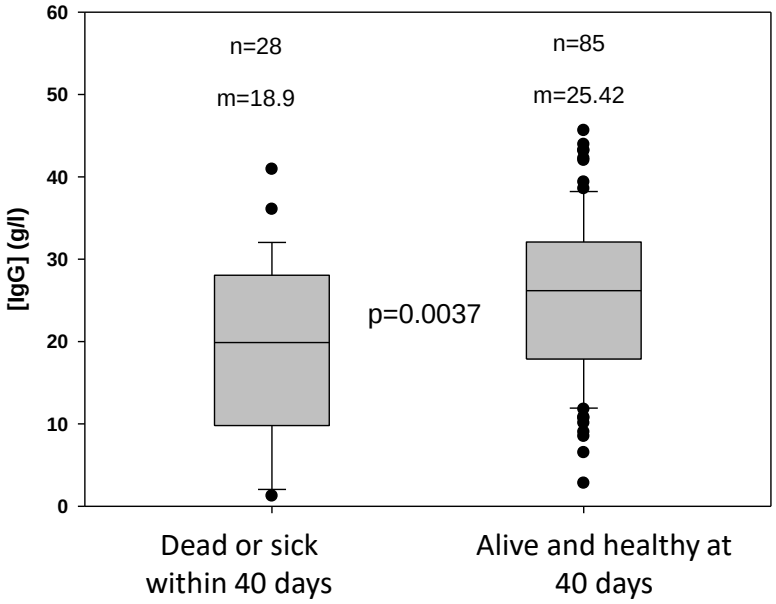
Relation colostrum [IgG] and lamb plasma [IgG]



No relation!

Lamb plasma [IgG] and health status by 40 days of life

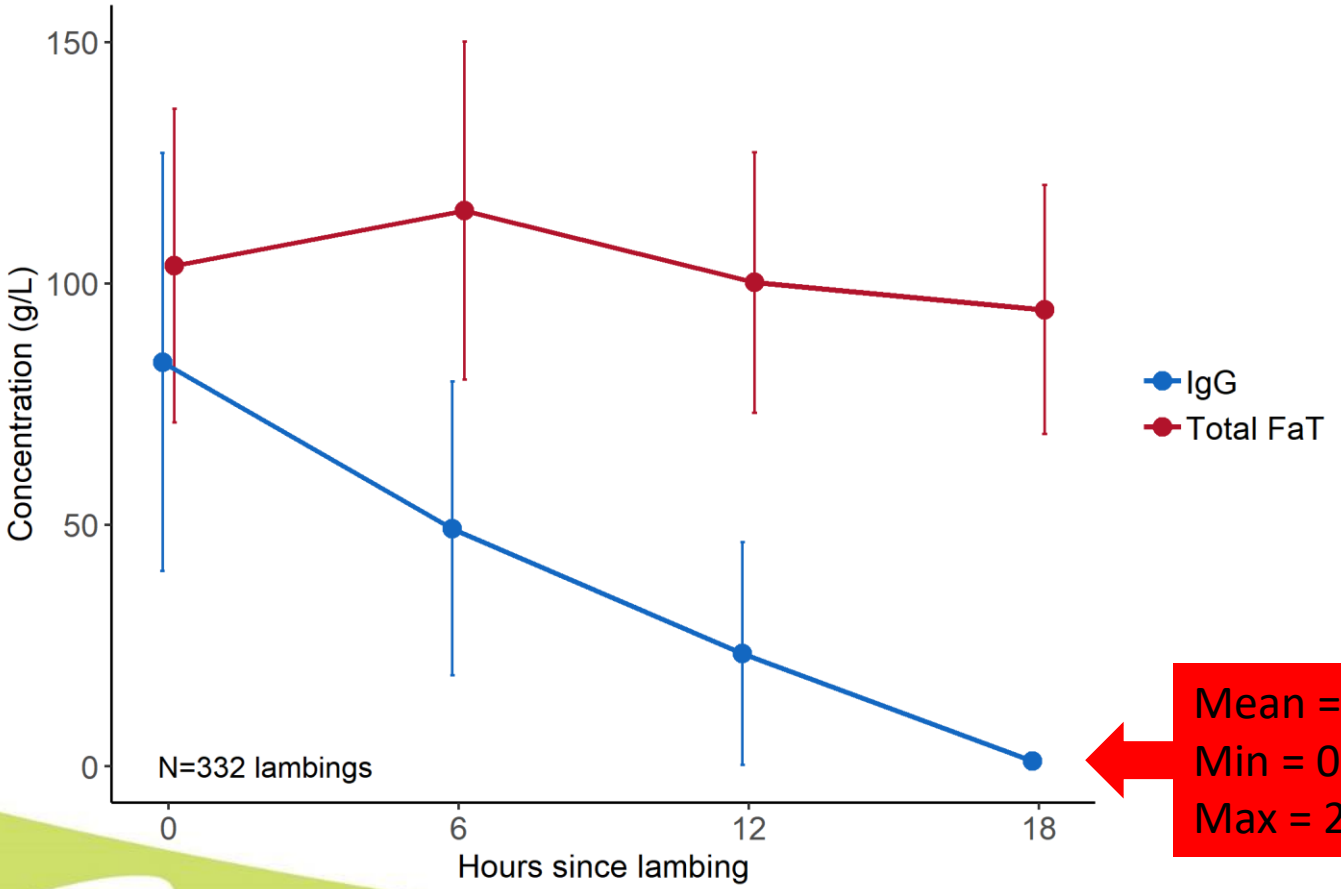
Dead or sick lamb within 40 days (Maternal feeding)



Effect	Adjusted Odd' s ratio*	95 CI %
[IgG] < 10 g/l	6.409	[1.6 - 25.7]
[IgG]> 15 g/l	2.136	[0.6 - 7.6]

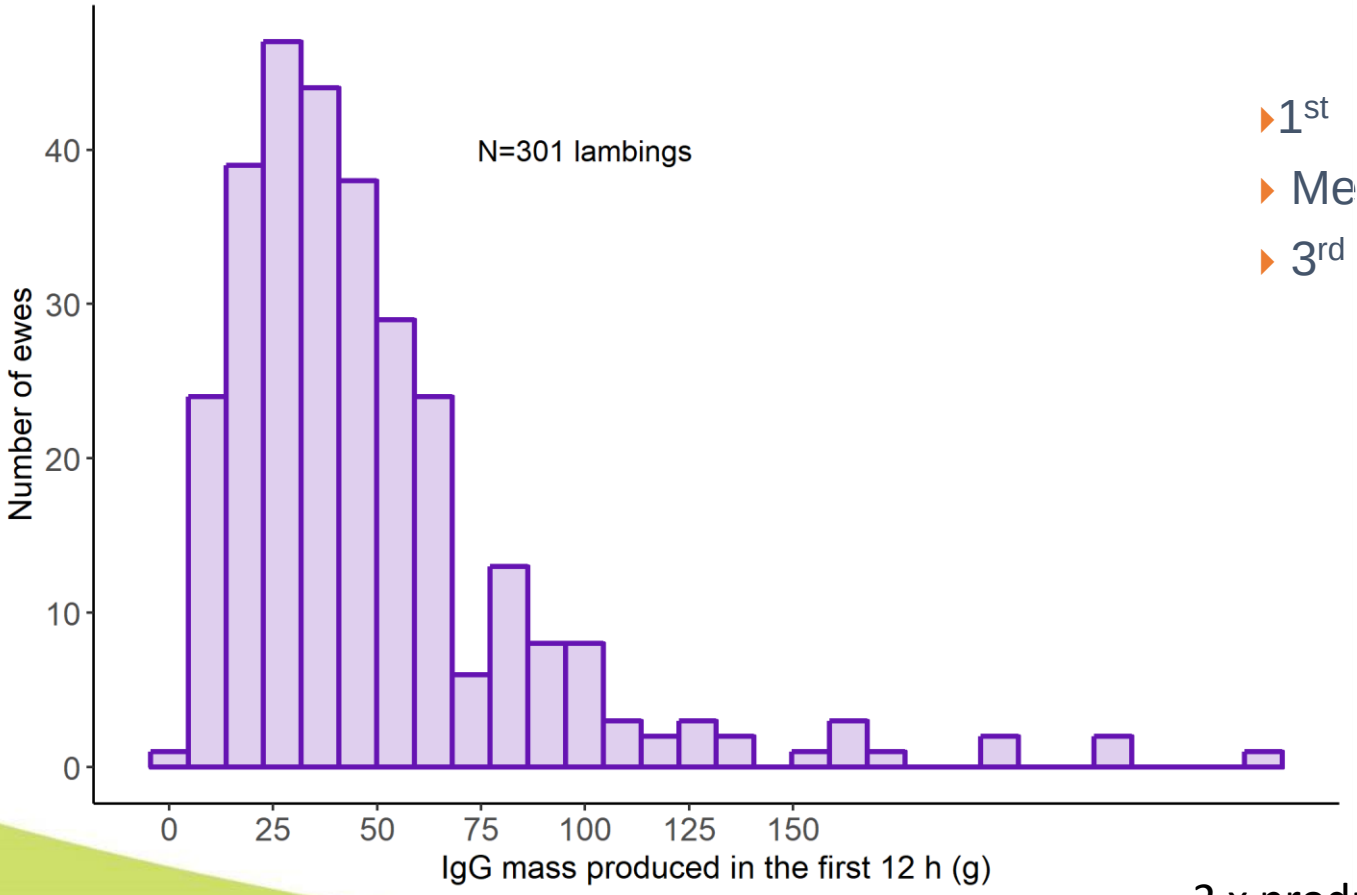
- Reference = [10 - 15] g/l,
- adjusted on birth weight, litter size, sex and ewe age

Evolution of colostrum [IgG] and [fat] at lambing



Mean = 1.1 g/l
Min = 0.3 g/l
Max = 2.8 g/l

IgG mass produced in the 12 first hours after lambing



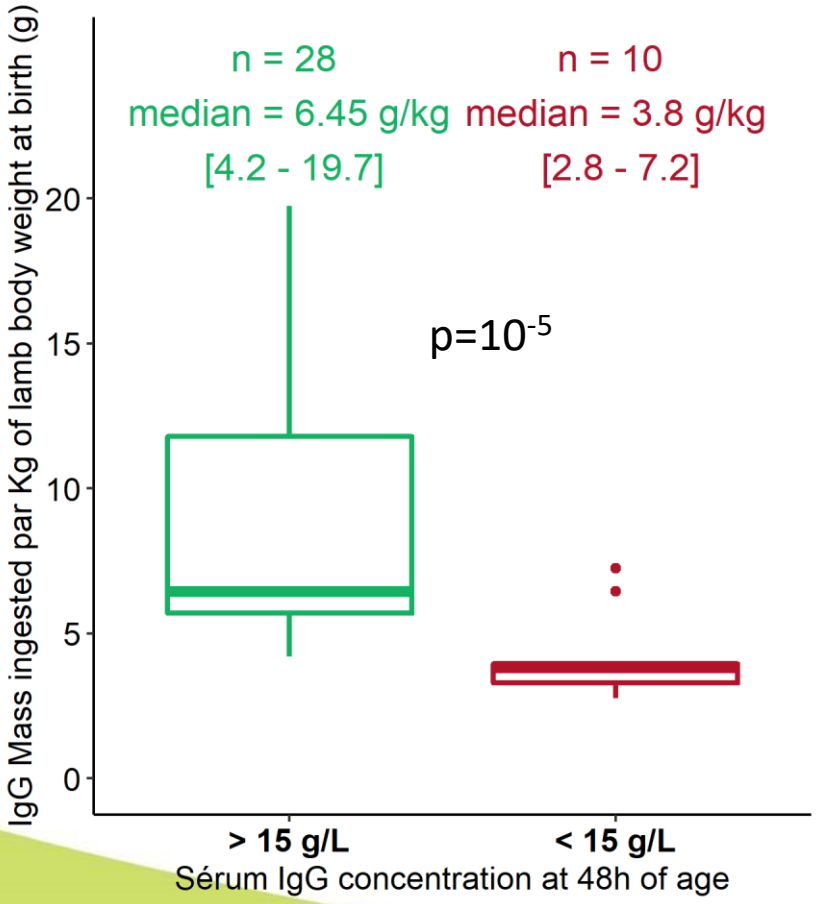
- 1st quartile : 25.0 g/L
- Median : 40.0 g/L
- 3rd quartile : 60.3 g/L

2 x production from ½ udder

Influent factors for IgG mass produced in 12h

- Breed
  - Lacaune (33.2 g) Vs Noire du Velay (26.3 g) , p =0.066
- Body Condition Score <2.4
  - IgG mass ↘ : -17.6 g (p=0.01)
  - Not in all experiments
- Udder health: subclinical mastitis
  - IgG mass ↘ : -15.1 g (p=0.08)
- Litter size
  - No effect once adjusted on breed, BCS, ...

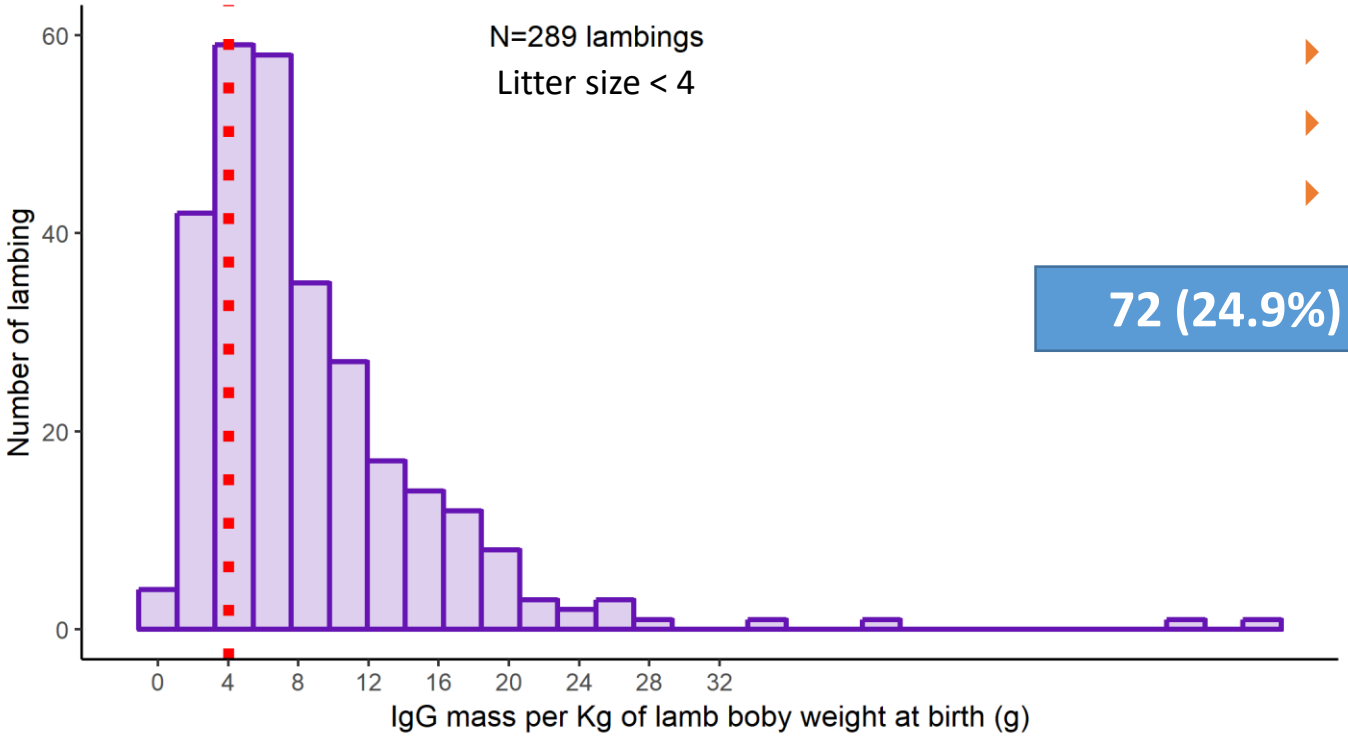
Influence of IgG mass ingested on transfert of passive immunity



IgG / kg LBW	Serum [IgG] at 48 h of age	
	< 15 g/L	≥ 15 g/L
< 4.0 g	**8**	0
≥ 4.0 g	2	**28**

$p=10^{-6}$

IgG mass produced in 12 hours per kg of lamb body weight



- 1st quartile = 4.1 g
- Median = 6.7 g
- 3rd quartile = 11.1 g

72 (24.9%) with < 4 kg IgG LBW

Breed : p = 0.57
BCS : p = 0.77
Lambing rank : p = 0.34
Litter size : p = 0.06

2 x production from ½ udder

Conclusions

- **IgG concentration**
  - Huge variation, ~ 20% of poor concentration at lambing
  - Almost no IgG by 18 hours after lambing
- **IgG mass produced**
  - Great variability between ewes and breeds
  - In 25% of cases, the IgG mass produced seems not to be enough
  - Impact of BCS and udder health
- **Transfer of passive immunity**
  - Not related to colostrum IgG concentration at lambing
  - Good TPI = at least 4 g IgG / kg birth weight ?

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