

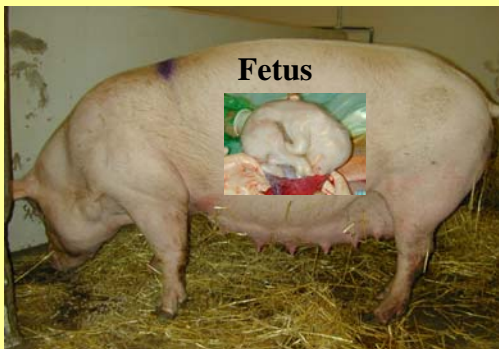
Uptake of immunoglobulins by the compromised newborn farm animal

What is a "compromized" state at birth?

- Premature spontaneous birth
- Birth complications
- Organ immaturity in animals born at term
- Birth by caesarean section
- Growth-retardation at birth
- Genetic/embryonic "defects" (e.g. IVF)



Immunological, nutritional and physiological transitions at birth.....



Sterile environment
Immune suppressed
Nutrition, oxygen and excretion via placenta
Stable temperature

Perinatal survival?

Cattle --93% (85-95)
Sheep --92% (80-95)
Horse --91% (85-95)
Pig ---- 87% (75-95)
Man -- 99% (90-100)

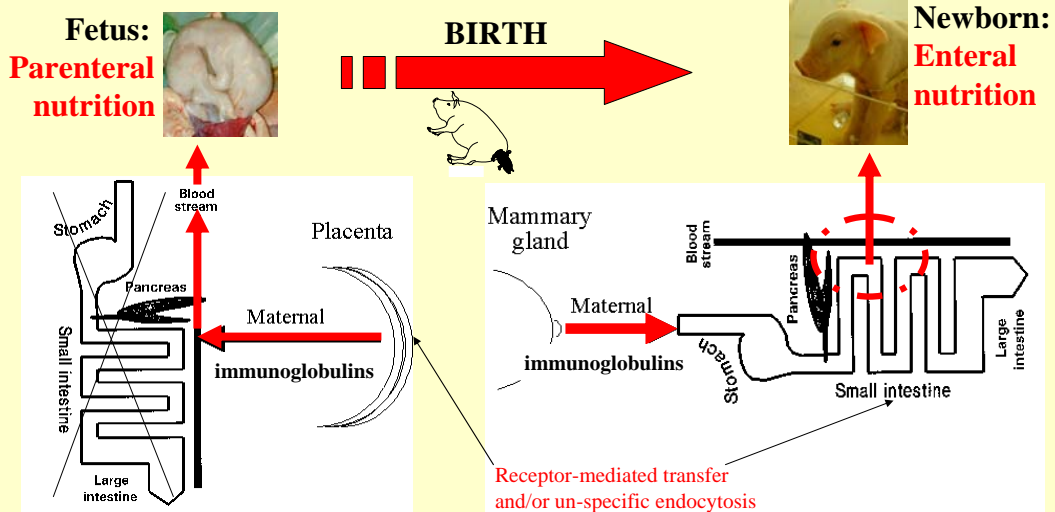
Microbial environment
Immune challenged
Nutrition, oxygen, excretion via gut, lungs and kidneys
Variable temperature

Transmission of passive immunity in different species:

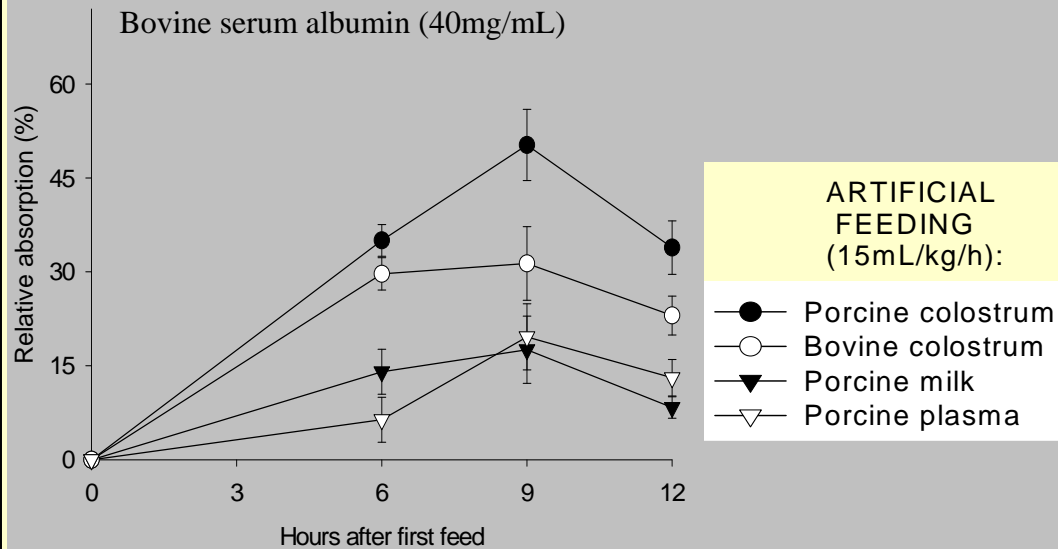
(0, no transfer; +, variable degrees of transfer, m.f. Brambell, 1970)

Species	Before birth (parenteral via <u>placenta</u>)	After birth (oral via <u>gut</u>)
Horse	0	+++ (24h)
Pig	0	+++ (24h)
Ox, goat, sheep	0	+++ (24h)
Wallaby	0	+++ (180d)
Dog, cat	+	++ (1-2d)
Fowl	++	++ (<5d)
Hedgehog	+	++ (40d)
Mouse	+	++ (16 d)
Rat	+	++ (20d)
Guinea Pig	+++	0
Rabbit	+++	0
Man, monkey	+++	0

Transfer of passive immunity via placenta or mammary gland + gut



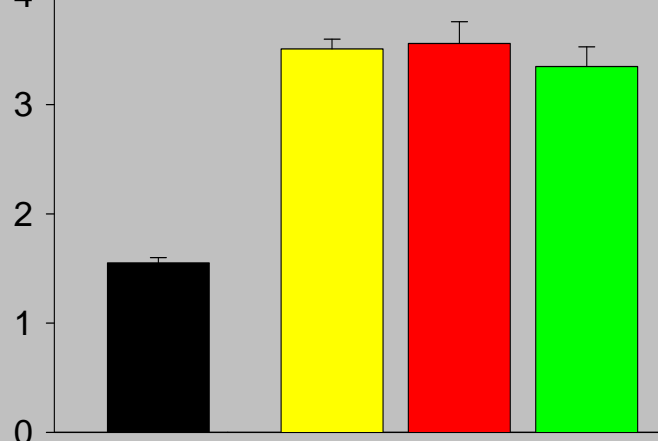
Uptake of large proteins by the newborn pig (Journal of Nutrition vol. 131, 2001)



Immunoglobulin absorption in pigs depends on type of feed (Journal of Nutrition vol. 131, 2001)

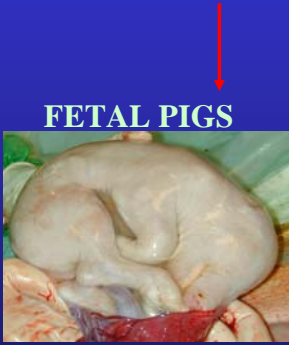
Newborn
 2d, sow colostrum
 2d, cow colostrum+pig serum
 2d, milk-replacer

Mucosa (% of body weight)



Intestinal capacity to absorb immunoglobulins - is it present before birth?

ENTERAL MILK
IMMUNOGLOBULINS

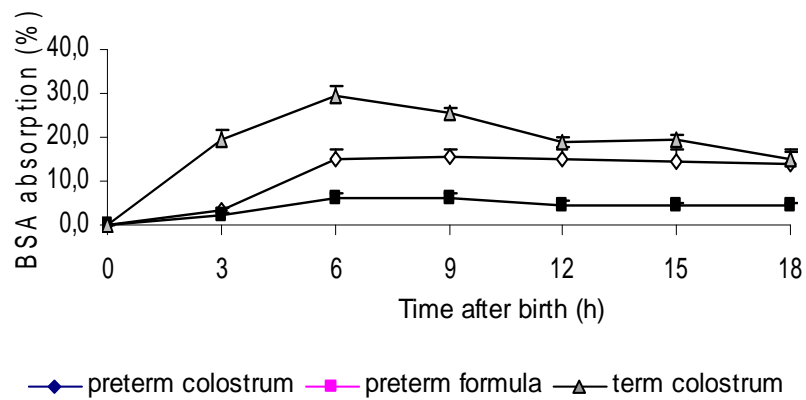


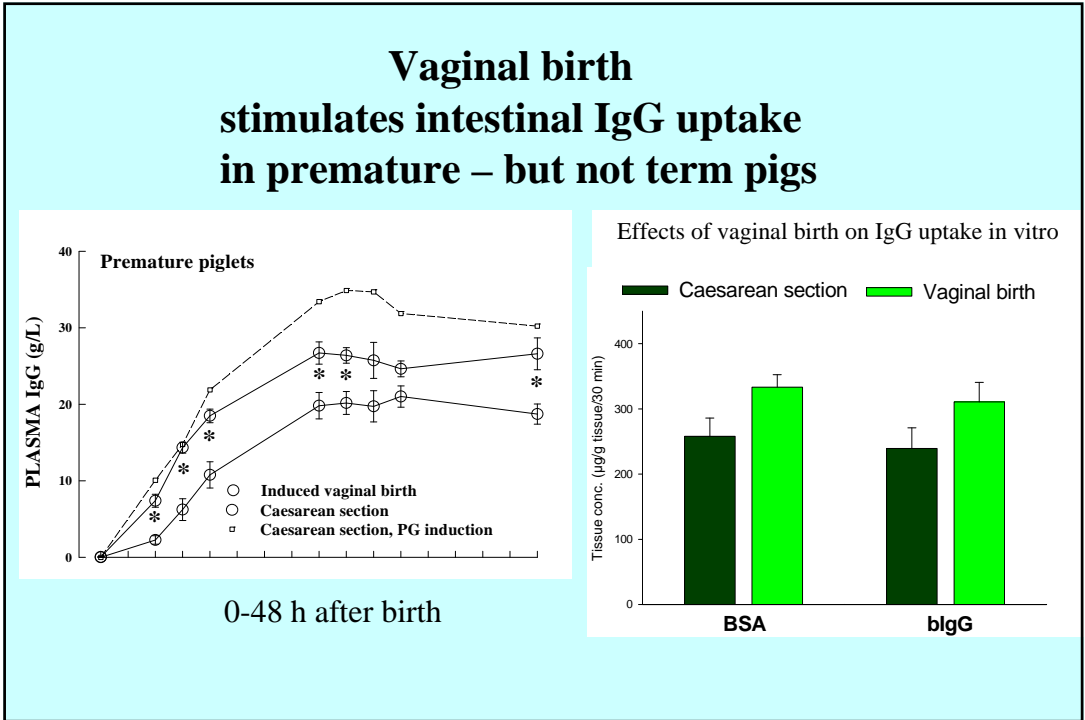
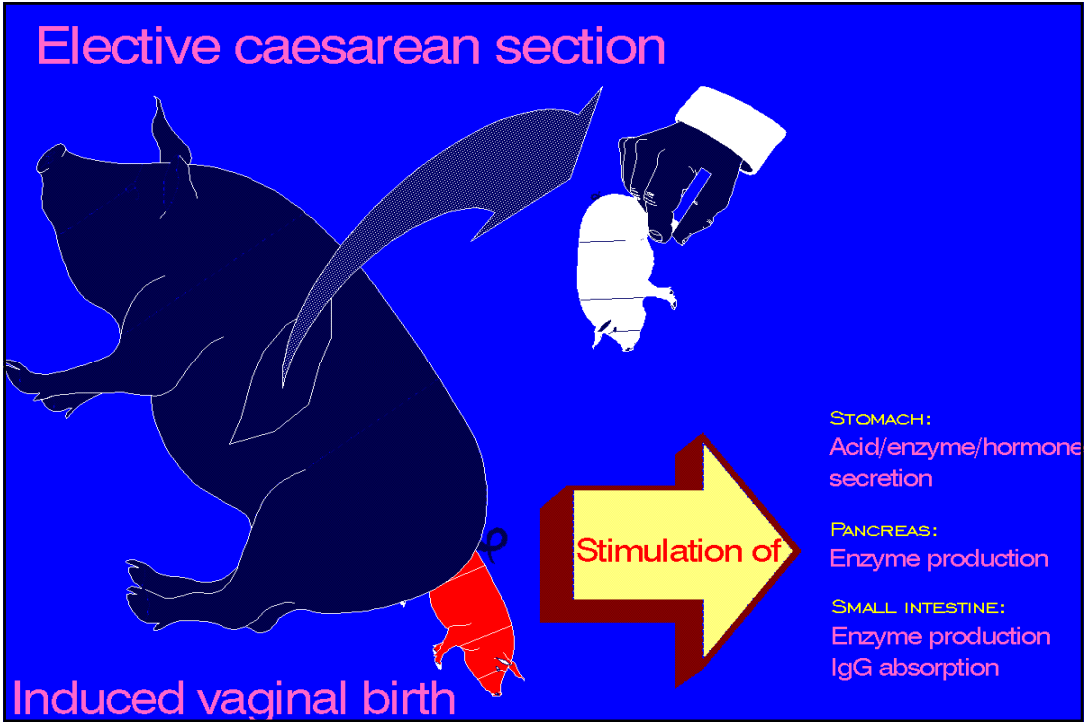
FETAL PIGS

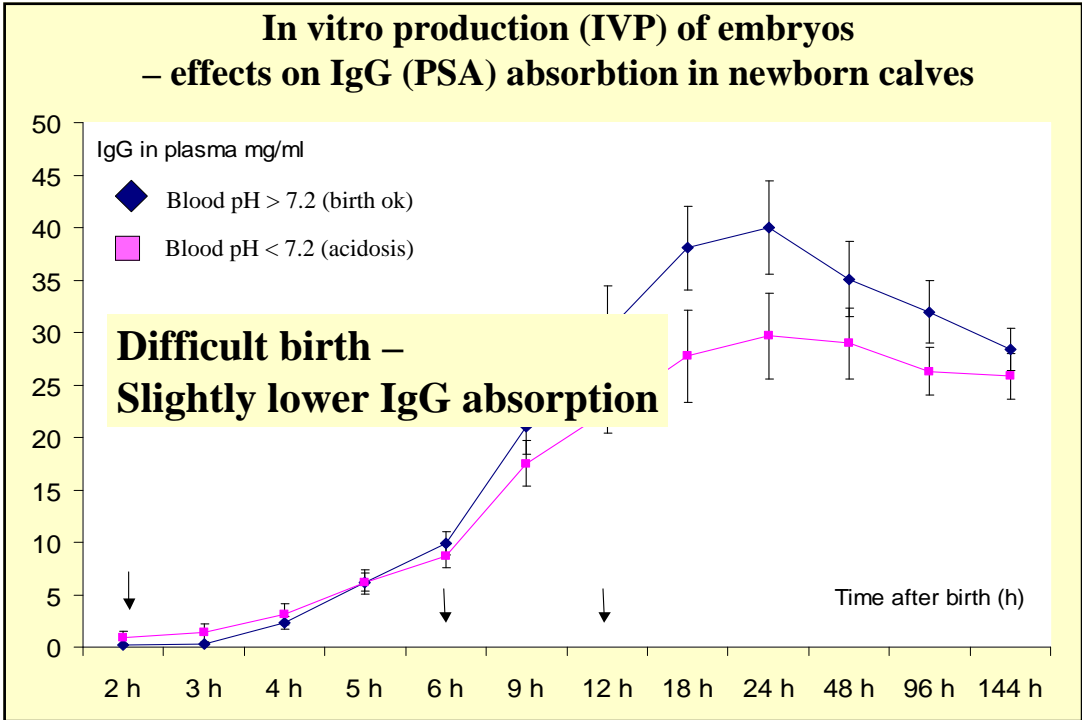
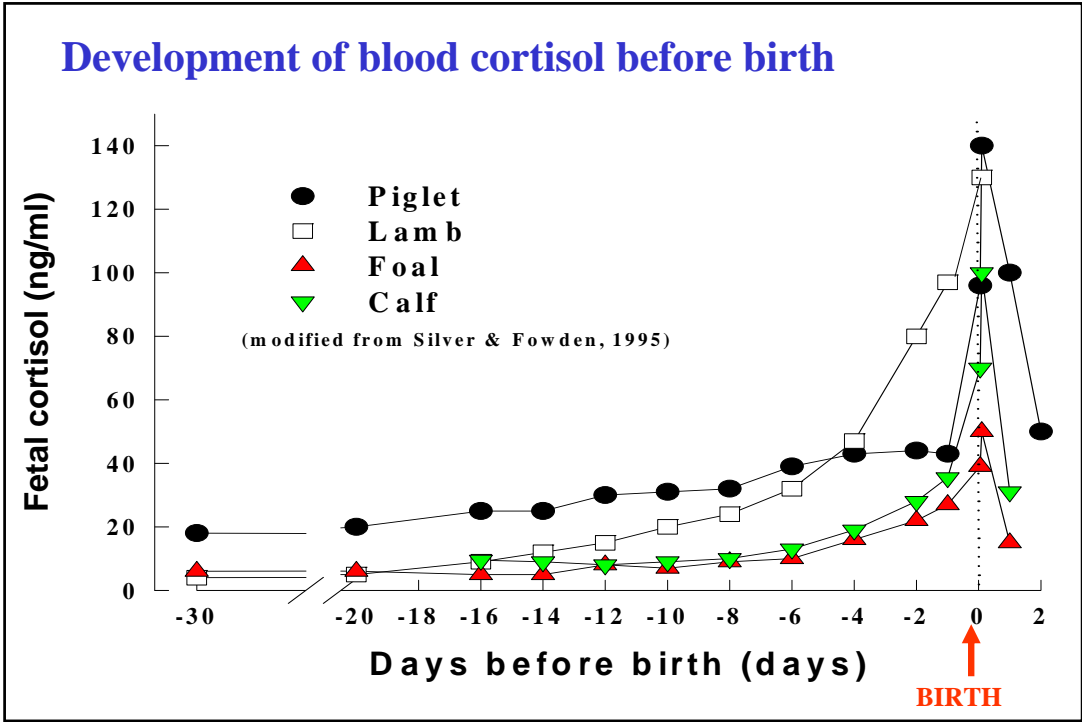
SYSTEMIC PASSIVE
IMMUNITY

Premature birth is associated with depressed immunoglobulin uptake in pigs

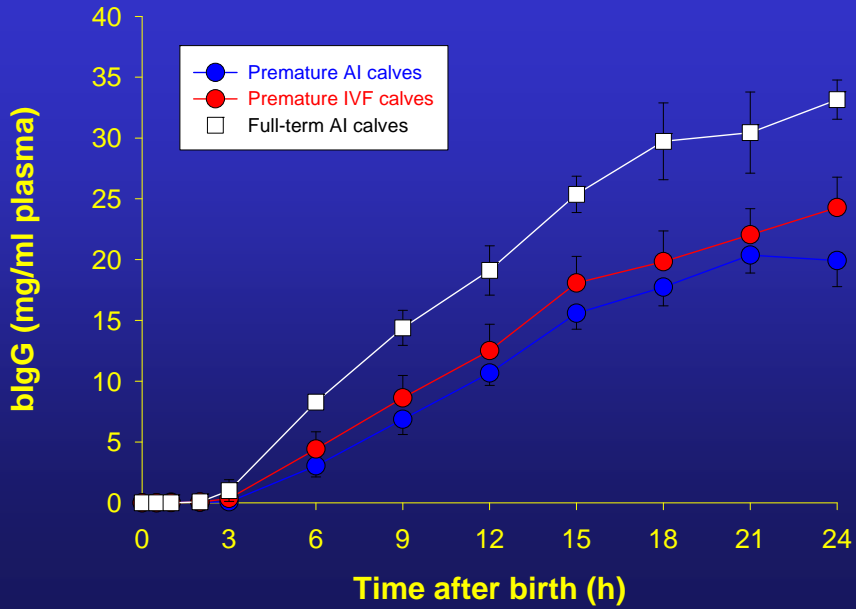
Bovine serum albumin







Intestinal immunoglobulin G uptake in calves - premature and term, control and IVF



Important survival parameters in calves delivered prematurely (90% gestation):

(Biology of Reproduction 62, 1504, 2000):

