TO THE POINT
with Dr. Tom Jenkins From Reproduction (2019) 158: 71-83.

Effects of a n-3 polyunsaturated fatty acid-enriched diet on embryo production in dairy cows

S Freret [1], M Oseikria [1], D Le Bourhis [2], A Desmarchais [1], E Briant [1], O Desnoes [2], M Dupont [1], L Le Berre [2], O Ghazouani [1], P S Bertevello [1], A P Teixeira-Gomes [3,4], V Labas [1,3], S Uzbekova [1], P Salvetti [2], V Maillard [1] and S Elis [1]

[1] *PRC, CNRS, IFCE, INRA, Université de Tours, Nouzilly, France*
[2] *Allice, Station de Phénotypage, Nouzilly, France*
[3] *PAIB (Pôle d'Analyse et d'Imagerie des Biomolécules), Plate-forme CIRE (Chirurgie et Imagerie pour la Recherche et l'Enseignement), INRA, Université de Tours, CHRU de Tours, Nouzilly, France*
[4] *UMR ISP, INRA 1282, Université de Tours, Nouzilly, France*

Holstein primiparous cows (n=37) were fed the same TMR supplemented with 1% of feed DM as either omega-6 fatty acids (n-6) from soybean oil or omega-3 fatty acids (n-3) from fish oil. Cows received the n-6 or n-3 diets for 9 weeks starting on week 11 of lactation. No differences were seen between the n-6 and n-3 groups for body weight, energy balance, dry matter intake or milk yield. All cows underwent oocyte retrieval followed by in vitro maturation, fertilization, and 7 days of embryo development. Quality of the produced embryos was assessed through treatment effects on blastocyst rate and quality.

The following are key results:

Plasma fatty acids, week 7	Soybean oil (n-6)	Fish oil (n-3)
Total n-6	41.3	46.2*
Total n-3	5.5	7.2*
Follicular fluid fatty acids, week 7	**Soybean oil (n-6)**	**Fish oil (n-3)**
Total n-6	38.1	37.3
Total n-3	4.8	6.6*
% Blastocysts	42.3	49.6*
Blastocyst quality (good quality freezable)	32.7	42.2*

Conclusions:

- Feeding omega-3 fatty acids reduces the n-6/n-3 fatty acids in plasma and follicular fluid in 7 weeks, which also was seen at 2 weeks.
- Omega-3 fatty acid supplementation enhanced embryo quality at 7 weeks, which also was seen at 2 weeks.
- A significant difference in lipid composition was seen between oocytes recovered from n-3 and n-6 treated cows.

THE POINT
n-3 supplementation enhances embryo quality in dairy cows.