FIGURE 1 The EPA/DHA research timeline

REQUIREMENT DEFINED Burr and Burr, 1929 Defined 18:2 Omega-6 and 18:3 Omega-3 as essential to the diet in mammals.	REQUIREMENT DEFINED Calder and Miles, 1998 Imbalance for Omega-6 and Omega-3 in part due to competition for key enzymes for elongation and desaturation that are shared by both pathways.	d BMBRYO EFFECTS Mattos, 2003 Showed linear decline in PGF2a as IFNr increased. Also reported reduction in PGF2a when 3 μM EPA/DHA added.	REPRODUCTION AND REPRO EFFECTS Bilby, 2006	BRYO EFFECTS ussavi, 2007 ding fish meal or Ca Salt IPA/DHA from 5-50 t improved early milk duction and DMI, with change in milk nposition.	Calder, 2013 Si Established essential rate for EPA/DHA Omega-3 at 10 in mg/kg in	MBRYO EFFECTS neding 10 grams of algal IA increased total egnancies and resulted return to pregnancy 21 iys sooner (absorbed IA est. at -1 g).
IMMUNE EFFECTS Serhan, 1994 Resolvins and Protec identified as speciali molecules derived fr actively resolve inflat	ctins discovered and S zed immune fr om EPA/DHA that E	MBRYO EFFECTS hattos, 2002 howed reductions in PGF2a om fish meal across range of PA/DHA supplementation vels (12.8 to 54 g).	EPA/DHA increase milk production, but also altered gene expression of IGF-I in the endometrium and metabolic hormones in a manner beneficial	EMBRYO EFFECTS Silvestre, 2011 EPA/DHA increases early e survival resulting in more p (+7 points early conception early aborts from 11.8% to	mbryo Estat regnancies for 18 rate, reduced mg/k	UIREMENT DEFINED lished requirement 3:2 Omega-6 at 75 gr5 or 45 grams rbed/day.
Thatcher, 1984 Identified EPA/DHA as possible remedy to early embryo loss in dairy cattle. EMBRYO		Mattos, 2003 Dose titration study with EPA, DHA where 18 grams (40 µM) had maximum effect on reducing PGF2a (basis for original 1/4 lb Strata feeding rate). EMBRYO EFFECTS	EPA/DHA increases early embryo survival (reduced pregnancy loss from 12% to 3.2%). EMBRYO	Linear milk Typ increase with Om EPA/DHA at the 2.7 lbs/7.5 g cap EPA/DHA up to 30 grams. and PROCUCTION RE(der, 2013 ical high ega-6 diets reduce elongation acity of 18:3 to active EPA (20:5) DHA (22:6). CUIREMENT FINED	Oseikria, 2016 Measured significant increase in day 7 oocyte development with just 1 µM of DHA. EMBRYO EFFECTS
EFFECTS	Thatcher, 1997 Established that levels of IFNr produced by embryo directly related to embryo size and development. EMBRYO EFFECTS		Moussavi, 2007 Results demonstrated that supplementation with fish Ca Salt of EPA/DHA in ear lactation significantly incre milk yield and DMI with no change in milk composition PRODUCTION EFFECTS	r dietary Fee meal or Om ly atte assed infla n. cha	co, 2015 ding a diet with more ega-3 and less Omega-6 nuated the acute phase immatory response r intramammary LPS llenge. MUNE ECTS	Ribeiro, 2016 EPA/DHA involved in elongation of conceptus, stored in high concentration in lipid droplets surrounding oocyte. EMBRYO EFFECTS