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FREE RADICALS AND ANTIOXIDANTS IN REPRODUCTION *WHERE TO DRAW THE LINE.*

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Superoxide radical has been initially portrayed as a demon in biology and been targeted as the responsible agent for many a number of pathological diseases, viz infertility, diabetes, cancer, atherosclerosis, stroke, psoriasis etc. Antioxidants have been attributed to possess all the miraculous properties including anti-aging and anti-disease benefits. Because of all the propaganda of the harmful effects of free radicals we too easily forget about the essential role of free radicals. It is important to remember that nature does not devise processes unnecessarily. Destruction of bacteria and virus-infected cells by white blood cells uses free radicals. Excessive antioxidants intake could cause fatigue and muscle weakness by decreasing ATP and mitochondria function." ATP, or adenosine triphosphate, is essential for energy production in the mitochondria, the part of the cell biologists describe as the "energy factory." Thus one should always remember that FREE RADICALS ARE ESSENTIAL FOR HEALTH. Different groups working on reproduction and other physiological aspects have off late reported that superoxide radical signaling is indispensable to attain proper execution of various cellular mechanisms. Pioneering work from our lab suggested the importance of superoxide and superoxide dismutase in ovarian luteal steroidogenesis and embryo implantation. The superoxide and associated endometrial membrane fluidity and lipid peroxidation changes in tandem modulate the endometrial membrane, causing restructuring to dock the invading embryo. This superoxide generation was observed to be NADPH dependent and thus the possibility of the existence of an activated NAD(P)H oxidase at embryo implantation was hypothesized. Estrogen appears to be a key regulator of this phenomenon acting as a molecular switch by regulating the NADPH oxidase activity positively. The reactive oxygen species generated by NAD(P)H oxidase, contribute to the activation of redox signaling and could involve activation of gene transcription for mediating gene expression changes under its impact. We have made recent leaps in understanding this phenomenon and have identified activation of STAT3 and its association with other molecules using computational biology to strengthen our observations. On the other hand, the emergence of the mammalian blastocysts from their thick glycoprotein investment known as the zona pellucida is an important, but poorly understood, event in embryogenesis. Work from our laboratory has

demonstrated that peri-hatching blastocysts generate a considerably high quantum of an active oxyradical species for an extremely short period of time thus leading to the hypothesis of the operation of a superoxide-dependent hatching initiation in developing mammalian embryos. A NAD(P)H oxidase activation is postulated to be the generator of superoxide at this time point in order to mediate zona-hatching. Thus defining the ration of functionally relevant/ deleterious superoxide could prove to be a diagnostic tool in reproductive health management.

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THE SURVEY OF MATERNAL AND FETAL EFFECTS ON CALVING TIME OF SINGLE PREGNANCY IN HOLSTEIN DAIRY CATTLE

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Introduction: Parturition is one of the most important aspects of cow's biology due to the vital role in the milk and calf production. The aim of this study was to find out the correlation between the calving time related to the maternal and fetal factors such as: number of parity, pregnancy duration, calf sex and live weight, rate of still birth, retention of fetal Membrane (RFM) and finally the effect of birth of season in Holstein dairy cows. **Materials & Methods:** During a 4 years study, the time of 2135 single calving were evaluated. The maternity section was stress free in the herd. The time of parturition stratified into 2 groups, 1-day time from 6 AM to 6 PM and 2-night time from 6 PM to 6 AM. The above factors mentioned were evaluated. Results were analyzed using Chi-square statistical method. **Results:** It was showed that 53.8% and 46.2% cows calved during the day and night time, respectively. One hour period from 08.00-09.00 had the highest deliveries with 119 birth, and at 23.00 had the minimum parturition with 62 births. The rate of RFM during the night and day time was 54.7% and 45.3%, respectively ($P < 0.05$). Most (69.7%) of the still births were occurred during the night ($P < 0.05$). Autumn with 688 calving (32.2%) and spring with 392 births (18.4%) had the highest and lowest rate, respectively. **Discussion & conclusion:** With preparing silent and stress free environment in calving time, the negative aspects of birth can be reduced and most of the calving will be occurred during the day time.

