TREATMENT OF LACTATING RED DEER HINDS WITH MELATONIN IMPLANTS ALTERS THEIR CALVING SEASON

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Two studies were carried out over consecutive years to examine effects of melatonin implants on reproductive performance of lactating red deer hinds.

Silicone rubber implants, each containing 300 mg melatonin, were administered subcutaneously on 24 January 1985 to 12 adult lactating red deer hinds. Subsequently mean calving date of implanted hinds was 17 November ± 1.7 days (S.E.M.), six days earlier than non-implanted hinds (mean 23 November ± 1.4 days, n = 12). In the following trial, specially formulated melatonin implants ('Regulin', Gene Link Australia Ltd) were implanted subcutaneously into a group of 8 lactating adult hinds on 20 December 1985 (Group 1) and into another group on 20 January 1986 (Group 2, n = 8). Hinds of both groups received a second lot of implants four weeks after date of initial implantation. Mean date of calving for Group 1 hinds was 6 November ± 1.2 days (S.E.M.), for Group 2 hinds it was 14 November ± 1.4 days and control hinds (n = 7) calved on mean date 22 November ± 2.8 days. Both types of implant maintained high daytime levels of plasma melatonin for at least 8 weeks although 'Regulin' implants produced higher melatonin levels than silicone rubber implants.

We conclude that the degree of advancement of seasonal reproductive activity was largely dependent on the date of commencement of treatment with melatonin.

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CAN WEDDELL SEALS RESPOND TO ELEVATED MELATONIN LEVELS?

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In Antarctica female Weddell seals (*Leptonychotes weddelli*) commence moulting their fur and implant a diapausing embryo during summer when there is constant daylight. Animals of temperate latitudes rely on the nocturnal rise in melatonin secretion for entraining the correct timing of seasonal events, so it is intriguing whether Weddell seals are capable of responding to changes in secretion of melatonin. This study investigated responses of Weddell seals to an artificial elevation of blood melatonin levels.

Seventeen lactating female Weddell seals had two melatonin implants ('Regulin', Gene Link Australia Ltd) placed subcutaneously on 18, 19 or 20 November 1985; 17 others served as controls. On 1, 2 and 3 December 1985 15 melatonin treated and 16 of the control seals were re-captured and sampled. Samples included femoral venous blood and a 1 cm^2 skin patch from a caudal mid-lateral site. Numbers of mitotically active cells visible in hair follicles were determined by microscopic examination of stained skin sections.

Serum melatonin concentrations were 0.13 ± 0.053 (mean ± S.E.M., n = 15) and 2.15 ± 0.472 (n = 13) nmol/l for control and implanted seals, respectively. Mitotically active hair follicle cells were present in about one-half of the 1325 follicles examined from 22 seals. However, there was a preponderance of follicles with multiples of mitotically active cells in skin sections from melatonin treated seals.

(mean ± SEM)	n	% follicles with active cells	% >1 active cell	% >2 active cells	% >3 active cells
controls	10	49 ± 4.5	18 ± 2.6	7 ± 1.7	1.5 ± 0.6
treated	12	56 ± 4.9	26 ± 5.0	12 ± 3.3	4.2 ± 1.5

Given that the treatment had proceeded only 12-16 days, the trend of these data indicates a possible response of Weddell seals to elevated circulating levels of melatonin.