**Restoration of Spermatogenesis in Non-Obstructive Azoospermia: Exploring Therapeutic Potency of Menstrual Blood Stem Cell Secretome and Melatonin**

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Non-obstructive azoospermia (NOA) represents the most severe manifestation of male infertility, presenting numerous challenges in the course of its treatment. This study evaluated the potential applications of secretome derived from menstrual blood stromal cells and melatonin for treating busulfan-induced azoospermia in the preclinical phase.

Thirty mice were randomly allocated into five groups: (1) Sham group, (2) Busulfan received group (NOA model), (3) NOA+Melatonin administration, (4) NOA+ Secretome administration, and (5) NOA+ Secretome + Melatonin administration. After confirmation of NOA induction, in groups 3 and 5, melatonin was administered intraperitoneally at 8 mg/kg weekly and continued for eight weeks. In groups 4 and 5, 10 μl of secretome was injected into both rete testis. Furthermore, an intraperitoneal administration of secretome (500 μl) was given over eight weeks. After the ward, the animals were euthanized, and the samples were taken for further evaluation.

The results indicate that the co-administration of melatonin and secretome enhanced the testicular weight index in animals with non-obstructive azoospermia. Therapeutic interventions in all three groups significantly improved sperm parameters. The best restoration in the level of testis morphology was detected in group 5.

These findings can start a new approach to discovering the definitive treatment of non-obstructive azoospermia and ultimately contribute to medical advances in fertility.

Keywords: Azoospermia- Busulfan- Stem cell- Secretome- Melatonin