

## **Presence of very small embryonic like stem cells (VSEL) in human semen; A novel finding**

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The presence of a very small, quiescent, and pluripotent population of stem cells termed as VSELS was first reported in 2006. Those cells are observed in various organs in the body including bone marrow, peripheral blood, endometrium, ovary, and testis so on. But their existence in seminal plasma has not been reported so far. To find out whether VSELS are present in human semen samples and, if so, study their characteristics and relationship with semen parameters. Semen samples were collected from sub fertile men and analyzed according to WHO guidelines. VSELS in seminal plasma were detected using Giemsa stain. The presence of cells with primitive germ cell properties was confirmed by GPR 125 expression and alkaline phosphatase activity. Very small (2-6  $\mu\text{m}$ ) and round cells population with a large nucleus and narrow rim of cytoplasm was observed in all semen samples. The mean (SEM) concentration of VSELS was 17.21 (4.42) m/ml. Two distinct populations of cells were identified according to their color intensity; VSEL dark and pale, 53% and 47% respectively. VSEL count was significantly high in oligozoospermic samples compared to samples with normal sperm count, 22.71 (5.89) vs 6.22 (1.81),  $p < 0.05$ . There was a positive correlation between VSEL and immature germ cells ( $r = 0.759$ ,  $p < 0.001$ ). Minor percentage of sub-populations positive for alkaline phosphatase activity (6.06 %) and expressing GPR 125 (5.56 %) were also observed. To the best of our knowledge this is the first report on the presence of VSELS in semen samples. Sub-population of cells with primitive germ cell properties would be a good source of stem cells for future studies on *in vitro* spermatogenesis.

**Keywords:** VSELS, Seminal fluid, Germ cells, *In vitro* spermatogenesis, Semen analysis

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