

cytes in late prophase I show a premature separation of homologous chromosomes with partial loss of the central element of SC and significantly increased distance between the centromeres. Taken together, our findings indicate that VCL plays an important role in the meiotic progression. We show that the VCL deletion in spermatocytes leads to considerable abnormalities on the level of chromosomal desynapsis which in the end results in the decreased breeding capability of VCL cKO males.

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High-resolution study of epigenetic processes: new insights into methylation and demethylation

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Methylation and demethylation are two epigenetic processes of a big relevance for different biological pathways. The two events happen on the carbon in position five of the cytosine belonging to the so called CpG island. The methylation implies the addition of a methyl group on the cytosine, forming the 5-methylcytosine (5mC) thanks to enzymes called DNMT (DNA-Methyltransferase). After, when required, the methyl group is oxidized or demethylated by a

family of enzyme called TET, forming the 5-hydroxymethylcytosine (5hmC). The role of the 5mC is generally correlated with gene expression repression, while the 5hmC function must be clarified. In this context, in order to elucidate the hypothetical role of these markers we decide to investigate at ultrastructural level, by looking at the distribution of two epigenetic modifications putting our attention on different areas of the cell nucleus. Our study was carried out by using transmission electron microscope, light microscope and molecular biology techniques. We observed that in condensed regions of the nucleus the DNA is always highly methylated rather than hydroxymethylated, but in the so called perichromatin region the pattern changes. Indeed, in this region it was possible to notice an abundance of demethylation underlined both by the presence of the 5hmC and of the enzymes involved in the processes: TET2. This result could allow to hypothesize a sort of activating role for the oxidized modification respect to its reduced form and underline how the perichromatin region is a dynamic region where DNA status changes.

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Lamin A and PI(4,5)P2 - a novel complex in the cell nucleus

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Lamins are important regulators of nuclear structural integrity as well as nuclear functional processes such as DNA transcription, replication and