1. INTRODUCTION

MicroRNA (miRNA) are small (~18 to 24 nucleotide) sequences of noncoding RNA that work as an endogenous epigenetic gene expression regulators. They regulate gene expression, either decreasing miRNA stability or translation, by binding to a partially complementary 3'UTR region of their specific target mRNA. They are thought to regulate the activity of 30–90% genes in mammals and participate in the regulation of many cellular processes. Consequently, they play a critical role in gene regulation.

Polycystic Ovary Syndrome (PCOS) is the most common endocrinopathy that affect women in their reproductive age (4 – 10%) and accounts for 75% of anovulatory infertility. It is aetiology remains unclear, although genetic and environmental factors are associated with the syndrome. It is mainly characterized by defects in folliculogenesis, leading to anovulation, and androgenization. In PCOS, defects in folliculogenesis are associated with multiple cysts in the ovary, while defects in steroidogenesis cause hyperandrogenism, one of the main signs of the syndrome. PCOS is associated with infertility and with increased risk of metabolic disorders such as diabetes, insulin resistance and obesity.

2. OBJECTIVES

The aims of this review are:
- To characterize the miRNA differentially expressed in granulosa and cumulus cells in PCOS patients.
- To characterize the signaling pathway dysregulated by this miRNA and its biological functions.
- To relate the differentially expressed levels of certain miRNA with the main affected pathways of PCOS and its possible implications in PCOS etiology.

4. RESULTS

Insulin resistance, associated with PCOS, is predicted to be induced by down-regulation of hsa-miR-483-5p and hsa-miR-486-5p in cumulus cells. TGF-β, Notch, MAPK signaling pathway, as well as the cell cycle, are down or up-regulated for miRNA in granulosa cells. Known targets that have an impact on this pathways are Notch3 and MAPK3. This dysregulation leads to dysfunctions in cell communication, oocyte development and maturation, cell development, differentiation and proliferation and G0/S cell cycle arrest.

3. MATERIALS AND METHODS

The methodology used for this review consisted on bibliographic search in PubMed in order to select the information most relevant for accomplishing the purpose of this review. Some filters were added as human species or publication date. Publications dated on the last 13 years were consulted. Some keywords were used: miRNA, Polycystic Ovarian Syndrome, granulosa cells, folliculogenesis, folliculogenesis. Lastly, the most important articles and reviews for the project were read and synthesized.

5. REFERENCES