

Title: Differential sub-localization of melatonin receptors in placental cells

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Placental trophoblasts are responsible for maternal-fetal exchanges and hormonal production. Trophoblasts are classified as extra villous trophoblasts (evTB) and as villous cytotrophoblasts (vCTB, mononucleated) that differentiate into syncytiotrophoblast (STB, multinucleated). Melatonin-synthesizing enzymes and melatonin receptors (MT1, MT2) are expressed and functional in human vCTB and STB, where they inhibit hypoxia/reoxygenation-induced oxidative stress and apoptosis. However, melatonin receptors in human evTB have never been studied. This study aims to characterize the melatonin receptors in evTB and to compare their subcellular localization in all trophoblast phenotypes. Placental tissues were obtained from first and third trimester pregnancies. Primary evTB were isolated from first trimester placentas and vCTB were isolated from first and third trimester placentas. Intracellular localization of receptors was determined by fluorescent immunocytochemistry. MT1 and MT2 are expressed in vCTB and STB (1st and 3rd trimester) and evCTB (1st trimester). mRNA expression of MT1 are three-fold higher in vCTB in comparison to STB and evCTB. MT2 expression is four-fold lower in STB compared to vCTB and evCTB. In extravillous trophoblast and villous cytotrophoblast, MT1 and MT2 are intracellular located and also on the membrane. Interestingly, both MT1 and MT2 co-localize with mitochondria in term vCTB. Melatonin receptors localization on mitochondria is in accordance with data showing its protection on mitochondria. Differential expression of melatonin receptors among types of trophoblasts suggests that melatonin may act through different pathways. The current employment of melatonin in clinical-trials to treat pregnancy diseases raises the necessity of better understanding of the role of mitochondrial melatonin receptor in trophoblasts.

Biography

Pr. Vaillancourt obtained her M.Sc. and Ph.D. degrees in Endocrinology from the University of Montreal (Canada) followed by postdoctoral studies in Psychiatry at the McGill University (Canada), and in Neurosciences at the University of Reading (UK). She is a placentologist. Over the past ten years, her research program funded by NSERC-discovery grant has allowed demonstrating a crucial role of melatonin and its receptors in placental function. Her group has shown that melatonin is highly produced in the placenta where it protects against molecular damage and cellular dysfunction arising from oxidative stress playing a protective role in pregnancy and fetal development.