mTOR functions by integrating extracellular signals, with amino acid availability and intracellular energy status to control translation rates and additional metabolic processes. Recently, DEPTOR has been described as a novel regulator of mTORC1 and mTORC2 complexes. Studies suggest that myometrial hyperplasia may be influenced via the Akt-mTOR signalling pathway and during labour there is an increase in proinflammatory cytokines. In this study we have tested the hypothesis that proinflammatory cytokines might affect mTOR signalling. Using RT-PCR and immunofluorescent analysis we demonstrate for first time that DEPTOR is expressed in human myometrium and has a cytoplasmic distribution at protein level. Human myometrial cells were treated for 24 hrs with IL-1β, IL-6, IL-8, TNF-α in an attempt to resemble a uterine inflammatory milieu in vitro. IL-1β treatment reduced expression of DEPTOR, raptor, rictor and mTOR by 39%, 44%, 33% and 31% respectively. IL-6 treatment downregulated modestly only mTOR (20%). On the contrary, IL-8 induced upregulation of DEPTOR, raptor, rictor and mTOR by 61%, 70%, 41% and 100% respectively. Finally, treatment with TNF-α led to a moderate downregulation of all components that does not appear to be significant. These data provide a novel insight into the mechanisms of myometrial mTOR regulation by cytokines and might implicate this pathway in events leading to labour and parturition.