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Basal mTORC2 activity and expression of its components display diurnal variation in mouse perivascular adipose tissue

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In adipose tissue mTOR complex 2 (mTORC2) contributes to the regulation of glucose/lipid metabolism and inflammatory molecule expression. Both processes display diurnal variations during the course of the day. RICTOR and mSIN1 are unique and essential components of mTORC2, which is activated by growth factors including insulin. To assess whether mTORC2 components display diurnal variations, we analyzed steady state mRNA expression levels of Rictor, mSin1, and mTor in various adipose tissues during a 24ăh period. Diurnally regulated expression of Rictor was detected in brown adipose tissues displaying highest mRNA expression levels at the beginning of the 12ăh light period (zeitgeber time 2, ZT2). Gene expression patterns of mSin1 and mTor displayed a similar diurnal regulation as Rictor in PVAT while smaller changes were detected for these genes in aorta during the course of the day. Basal mTORC2 activity was measured by phosphorylation of protein kinase C (PKC) α at serine 657 was higher at ZT14 as compared with ZT2 in PVAT. In line, gene expression of inflammatory molecules nitric oxide synthase 2 and tumor necrosis factor α was lower at ZT 14 compared to ZT2. Our findings provide evidence for a diurnal regulation of expression of mTORC2 components and activity. Hence, mTORC2 is possibly an integral part of diurnally regulated signaling pathways in PVAT and possibly in other adipose tissues.

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