Under constant conditions, many biological processes repeat regularly with a period about 24 hour, i.e., exhibit circadian rhythms. For example, these rhythms are in sleep/wakefulness, locomotor activity, hormonal secretion and body temperature. In mammals, circadian rhythms are controlled centrally from the hypothalamic suprachiasmatic nuclei (SCN). At the molecular level, the periodicity of these rhythms is due to the rhythmic expression of clock genes within individual neurons of the SCN. The expression of the clock genes is controlled by transcriptional-translational feedback loops. Apart form the SCN, the clock genes are rhytmically transcribed also in various peripheral tissues. The peripheral oscillations are synchronized centrally by the SCN clock that is entrained precisely to the 24 hour day by regular changes of the light and dark period, namely by the light period of the day. The central and peripheral circadian clocks drive rhythmic expression of clock-controlled genes and thus affect many physiological processes. Malfunctions in the circadian system may contribute to development of many diseases, such as malignant growth, obesity or sleep disorders. Circadian clock in the SCN develops gradually during prenatal and early postnatal period. In the rat, this period lasts from around 14th day of gestation till 10th day of the postnatal development. Circadian system of fetuses and pups is entrained mostly by non-photic maternal cues during prenatal and early postnatal development, respectively. Photic entrainment begin gradually prevail only after the first postnatal week. In my diploma thesis, I focused on the mechanism of maternal entrainment during prenatal and early postnatal development. The aim of my thesis was to ascertain whether restricted feeding regime of pregnant rats is able to entrain circadian clock in SCN of their fetuses during prenatal period, namely the daily rhythms in c-fos and Avp expression .