

# CHANGES IN THE RNA/DNA RATIO IN THE HUMAN MYOMETRIUM DURING PREGNANCY AND PARTURITION

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The RNA concentration in the myometrium is reduced in women with uterine inertia.

The contractile function of the uterus during parturition and, consequently, the character of development of labor depend on the concentrations of contractile proteins in the smooth muscle cells of the myometrium. Uterine inertia, a widespread and severe form of obstetric pathology, is thus associated by some workers with a decrease in the concentration of contractile proteins in the myometrium [1-3].

To study the molecular mechanisms of uterine inertia the content of nucleic acids in the human myometrium was investigated at various times of pregnancy and during normal and protracted labor.

## EXPERIMENTAL METHOD

The myometrium of the body of the uterus of 37 women aged 20-35 years was investigated. The myometrium of women undergoing hysterectomy for carcinoma of the cervix uteri or for fibroids of the body of the uterus was investigated outside pregnancy. Biopsy material from the myometrium was taken during caesarian section performed for various indications at different stages of pregnancy and during normal labor. If labor was complicated by uterine inertia, caesarian section was carried out because of the failure of induction of labor.

The concentrations of DNA and RNA in the myometrium were determined by two-wave spectrophotometry, after separation of the DNA and RNA fractions, by the method of Schmidt and Thannhauser [5] with some modification.

## EXPERIMENTAL RESULTS AND DISCUSSION

The experimental results are given in Table 1.

TABLE 1. Concentrations of DNA and RNA in Myometrium of Body of Human Uterus ( $M \pm m$ )

State of pregnancy and parturition	Number of cases	Nucleic acids (in $\mu\text{g}/\text{mg}$ dry weight)		RNA/ DNA
		DNA	RNA	
Outside pregnancy . . . . .	9	$10.68 \pm 0.85$	$7.24 \pm 0.45$	0.67
End of pregnancy . . . . .	10	$3.03 \pm 0.16$	$5.16 \pm 0.30$	1.70
Normal labor . . . . .	6	$2.86 \pm 0.19$	$5.27 \pm 0.38$	1.88
Uterine inertia . . . . .	7	$3.45 \pm 0.35$	$4.00 \pm 0.33$	1.15

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As Table 1 shows, the human myometrium at the end of pregnancy and before the beginning of labor contains considerably less DNA than the myometrium of the nonpregnant woman. Myometrial cells at term of normal pregnancy are characterized by a higher RNA/DNA ratio than the myometrial cells of the non-pregnant uterus. These results are in agreement with those obtained by Brody [4].

During normal labor the RNA concentration is about twice the DNA concentration. In uterine inertia the DNA concentration is higher, while the RNA concentration is lower than during normal labor. Uterine inertia is characterized by a considerable decrease (on the average by 40%) in the RNA/DNA ratio in the myometrial cells by comparison with normal labor. The contractile activity of the uterus is known to be the resultant of the contractile and relaxing properties of protein molecules which are synthesized in the cytoplasm of the myometrial cells. Accordingly, disturbance of RNA metabolism (most of the RNA is ribosomal RNA) and, consequently, disturbance of the synthesis of contractile proteins in the myometrium may lead to uterine inertia during labor. However, the mechanism of the decrease in the RNA concentration in the uterine muscle cells in this pathological state is unknown: it is not known whether the biosynthesis of RNA molecules in the cell nucleus on the DNA template, the transport of synthesized RNA molecules from the nucleus into the cytoplasm, or the formation of assembled ribonucleoprotein particles in the cytoplasm is disturbed.

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