WHAT IS KNOWN ALREADY
More than 90% of male infertility cases are due to low sperm counts, poor sperm motility, abnormal sperm morphology, or all. In asthenozoospermic patients, morphological and functional changes in sperm mitochondria have been described. Recent experimental data suggest that reduced efficiency of the mitochondrial respiratory activity may contribute to the reduced sperm motility.

STUDY QUESTION
One of causes of male infertility is reduced sperm motility. It turns out that the reduced efficiency of the mitochondrial respiratory activity may play a role in the development of this disorder. The aim of our study was to comprehensively determine mitochondrial respiratory activity of sperm with normal and reduced motility.

SUMMARY ANSWER
Quality of sperm motility is fundamental for reproductive success, analysis of sperm motility is a central part of evaluation of male fertility.

WHAT IS KNOWN ALREADY
More than 90% of male infertility cases are due to low sperm counts, poor sperm motility, abnormal sperm morphology, or all. In asthenozoospermic patients, morphological and functional changes in sperm mitochondria have been described. Recent experimental data suggest that reduced efficiency of the mitochondrial respiratory activity may contribute to the reduced sperm motility.

STUDY DESIGN, SIZE, DURATION
Prospective study. Ejaculates of all 14 men were obtained from IVF Center Prof. Zech, Pilsen. According to the World Health Organization classification, samples were divided into normozoospermatic (n = 7) and asthenozoospermatic (n = 7) groups.

PARTICIPANTS/MATERIALS, SETTING, METHODS
In our study, we measured mitochondrial respiratory activity of human sperm, permeabilized by digitonin, by high-resolution oxygraphy, which allows the determination of oxygen consumption from the smallest possible number of germ cells. Respiratory activity of sperm was measured on two-chamber oxygraph Oroboros (this process is illustrated in figure 1).

MAIN RESULTS AND THE ROLE OF CHANGE
In asthenozoospermic samples, significantly reduced activity of complex I (p = 0.007) and increased respiration after application of ATP-synthase inhibitor oligomycin (showing increased uncoupled oxidation and phosphorylation, p = 0.046) were found (representative traces of the oxygen consumption in normozoospermatic and asthenozoospermatic man are illustrated in figure 2). Inhibition of complex I by rotenone showed that complex I contribution to the total capacity of oxidative phosphorylation of healthy sperm was relatively lower than it is typical for somatic cells.

LIMITATIONS, REASONS FOR CAUTION
We did not analyze intact sperm, the spermatozoa cell membrane was permeabilized with digitonin.

WIDER IMPLICATION OF THE FINDINGS
Better characterization of male germ cells, either completely healthy or with affected motility, will help us to understand better the physiological process of fertilization and also to choose the most viable sperm for infertility treatment by methods of assisted reproduction.

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