Activating transcription factor 3 (ATF3) belongs to the ATF/CREB family of transcription factors. Various stimuli induce ATF3 expression in different cell types. Some of those stimuli are present during exercise. As a transcription factor, ATF3 regulates several genes in numerous tissues. However, the ATF3 role in skeletal muscle remains unknown. The purposes were: (1) to describe the skeletal muscle phenotype of ATF3-knockout (KO) mice at rest; (2) to determine the kinetic of ATF3 induction after exercise; (3) to elucidate genes regulated by exercise-induced ATF3. At rest, there were no differences between ATF3-KO and CON in the expression of metabolic proteins and enzymatic activity. ATF3 mRNA and protein levels peaked 1 and 3h after exercise, respectively. The ATF3 deletion affected the inflammatory response to exercise, particularly by upregulating the expression of chemokines, Ccl2 and Ccl6 for example. ATF3 might affect the monocytes/macrophages infiltration.