

Non-thermal Plasma Promotes Boar Sperm Quality Through Increasing AMPK Methylation

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Abstract : Boar sperm quality, as an important indicator of reproductive efficiency, directly affects the efficiency of livestock production. Here, this study was conducted to improve the boar sperm quality by using a non-thermal dielectric barrier discharge (DBD) plasma. Our results showed that DBD plasma exposure at 2.1 W for 15 s could improve boar sperm quality by increasing the exon methylation level of adenosine monophosphate-activated protein kinase (AMPK) and thus improving the glycolytic flux, mitochondrial function, and antioxidant capacity without damaging the integrity of sperm DNA and acrosome. In addition, DBD plasma could rescue DNA methyltransferase inhibitor decitabine-caused low sperm quality by reducing oxidative stress and mitochondrial damage. Therefore, the application of non-thermal plasma provides a new strategy for reducing sperm oxidative damage and improving sperm quality, which shows great potential in assisted reproduction to solve the problem of male infertility.

Keywords : non-thermal DBD plasma, sperm quality, AMPK methylation, energy metabolism, antioxidant capacity

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