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In this paper, we report on the viability and proliferation of mesenchymal stem cells after exposure to different types of semiconductor nanoparticles. The nanoparticles used for the tests are based on GaN thin layers grown on commercial ZnO and ZnFe₂O₄ nanoparticles. Different quantities of nanoparticles incubated with mesenchymal stem cells influence the metabolic activity of cells, which was assessed by the MTT assay. The cytotoxic effect of ZnO nanoparticles on MSC was demonstrated and no harmful effect of the other materials.