**An overview of the applicability of magnetic nanoparticles in biomedical sciences**

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**ABSTRACT:**

Small objects with magnetic characteristics, usually less than 100 nanometers in size, are known as magnetic nanoparticles. Iron oxide, cobalt, nickel, and other magnetic materials are just a few examples of the materials that can be used to create these particles. Numerous possible uses for magnetic nanoparticles exist in industries like biomedicine, electronics, and environmental science. They can be utilized in bioengineering for magnetic hyperthermia cancer therapy, targeted drug delivery, and magnetic resonance imaging (MRI). Various techniques, such as chemical precipitation, heat breakdown, and solvothermal approaches, are frequently used to create magnetic nanoparticles. Magnetic nanoparticles can be covered with biocompatible substances for biological uses to increase their durability and lessen their toxicity. Magnetic hyperthermia, a cancer therapy that employs magnetic nanoparticles to produce heat in tumors, is another application for magnetic nanoparticles. Overall, magnetic nanoparticles have a variety of potential applications and are still a hot topic for research and development. This review comprises of various magnetic nanoparticles like iron, cobalt and nickel, their synthesis and surface modification, along with their applications in biomedical sciences.

**KEYWORDS:**

Magnetic Nanoparticles, Synthesis, Biomedical application, Nanomaterials, Iron oxide, Magnetic resonance imaging