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November 20, 2018

Advertisement

Applications are invited for a post of **Junior Research Fellow (JRF)** in **DST Nano Mission** sponsored project entitled *"**Development of Magnetic Therapeutic Agents for Thermo-Chemotherapy of Cancer**"*.

Essential Qualifications:

Post Graduate Degree in Basic Sciences (Physics / Chemistry / Life Sciences) with at least 60% marks or equivalent grade and NET qualification.

OR

Graduate Degree in Professional Course with NET qualification.

OR

Post Graduate Degree in Professional Course.

Age limit: 28 Years

Duration of the Project: Three years

Fellowship: Rs. 25000/- + HRA (10 %)

For the reference of applicants, the synopsis of the project is attached with this advertisement. Interested candidates may send their applications along with a detailed resume at bnchudasama@thapar.edu by **December 10, 2018.**

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Synopsis of the project

Development of Magnetic Therapeutic Agents for Thermo-Chemotherapy of Cancer

Bhupendra Chudasama

The term cancer refers to a class of diseases, in which a group of cells display uncontrolled growth, invasion and metastasis. In 2014, it has been reported by World Health Organization that cancer is the leading cause of mortality with an estimated 8.2 million deaths per year. According to the latest report from the International Agency for Research on Cancer, 60% of new cases of cancer are in developing countries. In India every year ten lakh people are diagnosed with cancer and half of them die due to the poor treatment modalities. On-going research initiatives are not sufficient for the complete understanding and control of cancer. Limitations of current treatment modalities can be overcome by 'thermo-chemotherapy' – a combination therapy which combines magnetic hyperthermia with targeted chemotherapy. Cancerous cells undergo apoptosis when exposed to elevated temperatures beyond 42 °C. In magnetic hyperthermia, cancerous body tissues got selectively killed by heat produced due to the magnetic energy losses of nanoparticles in AC magnetic field. Despite of the simplicity of this method, it is not yet realized due to the lack of availability of suitable magnetic nanostructures whose magnetic losses can be localized and confined to hyperthermia temperature (42 °C). To realize magnetic hyperthermia, it is necessary to engineer magnetic nanostructures whose Curie temperature is close to 42 °C. In targeted chemotherapy, anticancer chemotherapeutic drugs are guided to cancerous tissues by using biocompatible magnetic nanocarriers, which can distinguish between healthy and cancerous tissues and can release chemotherapeutic drugs at the targeted site. In this project we propose to develop a combination therapy by combining magnetic hyperthermia with targeted chemotherapy. Major objective of this proposal is to design functionalized magnetic nanostructures with low Curie temperature that can selectively bind to cancerous cells by means of active targeting, internalize through endocytosis or phagocytosis, induce magnetic hyperthermia and releases antineoplastic drugs at the targeted site in a programmed manner. Proposed combination therapy will have advantages over traditional hyperthermia and conventional chemotherapy as better anti-cancer effects at lower therapeutic dose and lower therapeutic temperatures can be achieved. The possibility of triggering the drug release at cancerous sites provides unique opportunity to control the spatiotemporal release of drugs, which is far from realization in other modes of drug delivery. Propose therapy would be much more efficient as compare to existing treatment modalities with minimal toxicity and would be an economic solution to otherwise expensive cancer therapies.
