

3. BRIEF REVIEW OF THE WORK ALREADY DONE IN THE FIELD

The comprehensive literature review carried for the cancer and nanocarriers used in the treatment, various nanocarriers and polymer used in the treatment including targeted site. The nanocarriers are the unique delivery system for drugs like cancer. Till date, few work focused on anticancer nanoparticles, so our work can give a new aspect in this area. A detail of the important work that has been carried out is summarized below:

1. Disease

2. Nano particles

3. bandamustine

4. anti-cancer drugs

- **Kyung Hyun Min et al., (2008)** reported the work based on chitosan nanoparticles-encapsulated camptothecin for cancer treatment ⁵⁷.
- **Jae Hyung Park et al., (2010)** reported the role of low molecular drugs in targeted delivery ⁵⁸.
- **Wang et al., (2011)** formulated chitosan-cyclodextrin nanospheres of doxorubicin hydrochloride by in situ formation to achieve sustained release ⁵⁹.
- **Rajashree Nanda et al., (2011)** prepared and performed characterization of chitosan–polylactide composites blended with Cloisite 30B ⁶⁰.

- **Joung-Pyo Nam et al., (2013)** formulated paclitaxel and lauric acid-*O*- carboxymethyl chitosan-transferrin micelles ⁶¹.

- **Chao Feng et al., (2014)** reported oral bioavailability of chitosan and doxorubicin hydrochloride ⁶².
- **David Lucio et al., (2014)** reported role of polymorphism of chitosan and carboxymethyl chitosan and its solubilisation ⁶³.
- **Khan et al., (2016)** formulated Bendamustine nanoparticles by using different polymers i.e. PLGA, PEG) and evaluated that these nanoparticles have anticancer activity against various cells ⁶⁴.
- **Gidwani and Vyas (2016)** reported through research work based on stability studies of bendamustine PLGA nanospheres for three months that showed the slight variations in zeta potential and particle size ⁶⁵.
- **Franiak et al., (2017)** reported through his research work Glycodendrimer PPI which showed that the dendrimer have significant action on gene protein with lesser harmful effects in CLL cells ⁶⁶.
- **Bhandari et al., (2017)** revealed by research work based on aerogels of cellulose nanofibre and its applicability in oral drug delivery ⁶⁷.
- **Taylor et al., (2017)** reviewed the genetics bases, diagnosis and types of hematological cancer. They elaborated that genetic changes affects TP53 which can be used for therapeutic site for disease management and BRAFV600E mutations can be for the diagnosis of chronic lymphocytic leukemia ⁶⁸.
- **Vinhas et al., (2017)** reviewed the utilization of nano particles for the leukemia treatment management. They discussed about the novel approaches and types of constructs of nanomedicines in liquid tumors ⁶⁹.
- **Hallek et al., (2018)** reported the current progression in the lane of treatment and management of CLL with the challenges ahead ⁷⁰.
- **Thomas et al., (2018)** studied the optimized and fabricated Bendamustine loaded hydroxyapatite nanoparticles through in vitro, in vivo, and analytical studies ⁷¹.

- **Ziamba B et al., (2020)** revealed through his research work in-vitro studies in xenograft model by Glycodendrimer Nanoparticles. The reported results showed inhibition in extend of CLL ⁷².
- **Franiak et al., (2020)** formulated the dendrimers and explained that Cationic PPI-G4-M3 has maximum anti cancer activity and elevated toxicities as compare to neutral dendrimers, fludarabine in CLL ⁷³.
- **Shakeran et al., (2021)** Designed chitosen based biodegradable nanocarriers for methotrexate drug delivery in breast cancer. The result showed that significant decrement in viability of cells achieved at low concentrations ⁷⁴.
- **Cavalcante et al., (2021)** reported through their research work based on the methotrexate and PLGA nanoparticles in which they targeted the STAT3/NF-κB signaling ⁷⁵.
- **Li et al., (2021)** reported that PLGA based nanocarrier of Paclitaxel have precise targeting capability in colorectal cancer ⁷⁶.
- **Ghilardi et al., (2022)** revealed that Bendamustine have similar efficacy and lesser toxicities as compare to fludarabine and cyclophosphamide in lymphodepletion ⁷⁷.
- **Ghaz-Jahanian et al., (2022)** reviewed the chitosan nanocarriers application in tumor targeted drug delivery system ⁷⁸.
- **Resen et al., (2022)** reported the usefulness of fluorouracil and gemcitabine hydrochloride based citosan coated nanoparticles in breast cancer ⁷⁹.
- **Priya et al., (2022)** reviewed the pharmaceutical applications of nanofibres based on polysaccharides ⁸⁰.
- **Rinaldi et al., (2022)** Prepared nanostructures of oleic acid (pH-sensitive). That suggests the combining drug delivery in pH-dependent show the anti cancer effect for fatty acid and is the key feature for future based treatment for melanoma disease ⁸¹.
- **Zhang et al., (2022)** reported the role of lipid polymer nanocomplexes in disease management ⁸².
- **Xiong et al., (2022)** confirmed the DTIC-NPs-Apt as active target for anticancer drugs in the treatment with no side effects in melanoma ⁸³.

- **Singh et al., (2022)** designed the micelles of PLGA and (soya) lecithin for improved efficacy of methotrexate in cancerous cells ⁸⁴.