

## **Nano-Curcumin pills to treat chronic ailments**

Gellan gum is a high molecular weight polysaccharide (i.e., complex sugar) gum produced as a fermentation product by a pure culture of the microbe *Sphingomonas elodea* (formerly known as 'Pseudomonas elodea'). Its structure consists of four linked monosaccharides (i.e., simple sugars), including one molecule of rhamnose (a sugar found in various plants), one molecule of glucuronic acid (an oxidized glucose molecule), and two molecules of glucose (a component of sucrose, which is common sugar). The exact molecular formula of gellan gum may vary slightly e.g., depending on the degree to which the glucuronic acid is neutralized with various salts.

“Gellan Gum”, (GG) widely used in food and confectionary industry as a thickening and gelling agent. Because of this property, it has been used as a reducing and stabilizing agent for the synthesis of gold nanoparticles. These nanoparticles display greater stability to electrolyte addition and pH changes relative to the traditional citrate and borohydride reduced nanoparticles. Subsequently these have been used to load anthracycline ring (anthracyclines (or anthracycline antibiotics) are a class of drugs used in cancer chemotherapy, see wikipedia)) antibiotic doxorubicin hydrochloride (an antibiotic used as an anticancer drug). The drug loaded on these nanoparticles showed enhanced cytotoxic effects on human glioma (Glioma is a tumor in the glial cells (Glial cells line our central canal of the spinal cord to the brain. Types of glial cells are radial glia, schwann cells, oligodendrocytes and astrocytes). These cells are located in the Central Nervous System, also known as the CNS. A glioma is usually considered as a brain tumor that usually becomes cancerous) cell lines.

In this study the team took advantage of the reducing and stabilizing properties of the GG for the synthesis of gold nanoparticles.

Nanoparticle based drug delivery systems are considered a good alternative because nanoparticles showed its ability to cross BBB effectively. In this background, it was found that gum loaded nanoparticles possessed additional advantageous as reported that BBB contains glucose receptors and thus the nanoparticles stabilized by GG with many sugar moieties may be favored to cross the BBB.

The activity of nanoparticles on gial cells was assessed, the drug that was loaded on the nanoparticles showed enhanced cytotoxic effect as compared to pure drug taken at same concentrations present on the nanoparticle and also stayed on the surface showing its effectiveness for a longer period of time. This was observed and stated by Dr. Anjali Shiras from National Centre for Cell Science (NCCS), where she assessed, the activity of nanoparticles.

Anticancer drugs generally face a big problem against brain tumors because, the Blood Brain Barrier (BBB) does not allow the drugs to cross it and as a result, delivery to the tumor site is blocked. Nanoparticle based drug delivery systems are considered a good alternative because nanoparticles showed its ability to cross BBB effectively. In this background, it was found that gum loaded nanoparticles possessed additional advantageous as reported that BBB contains glucose receptors and thus the nanoparticles stabilized by GG with many sugar moieties may be favored to cross the BBB. While the present work showed the effective anti-cancerous activity of drug loaded-GG stabilized-Gold nanoparticles in vitro future studies NCL alongwith NCCS is currently actively pursuing the *in vivo* studies.

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Reference:

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