Nanomedicine & Biotherapeutic Discovery

Extended Abstract

# Nanoparticles and DNA damage

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## Abstract

Nanoparticles or NPs are known to cause DNA damage for over at least the past decades, but the causal relation of NPs to human health remains unknown. Chemical reactions of NPs with the DNA cannot be the causal relation as DNA damage occurs even with inert gold NPs suggesting a physical causal relation such as high temperature. Photodynamic therapy is thought to kill cancer cells by high temperatures in laser heating of NPs. Although the laser increases the temperature of surrounding tissue, the NP temperature itself does not because the Planck law of QM requires the NP heat capacity to vanish. QM stands for quantum mechanics. Contrarily, photodynamic therapy does not induce necrosis of cancers by increasing the temperature of the quantum sized NPs and instead NPs produce EM radiation beyond the UV that induces cancer necrosis suggesting the causal relation of NPs to human health is therefore the well-known genotoxicity of DNA to UV radiation. The wavelength ? of the emitted EM radiation is, ?= 2nd, where n and d are the refractive index and diameter of the NP. For NPs having n=1.5, DNA damage for EM radiation beyond the UVC (?< 254 nm) occurs for NP diameters d<85 nm. Solar UV is only thought to cause DNA damage to the skin and may lead to cancer, but cannot penetrate the skin to damage internal organs. However, NPs rescind this paradigm. Indeed, NPs by entering the body in the GM food we eat produce the low levels UV to damage the DNA of tissue in the gut and digestive tract. The DNA damage from GM food that includes NPs in Monsanto???s Roundup herbicide enhances crop yields by controlling weeds in modern agriculture are discussed. To avoid genetic cancers in human DNA evolution, herbicide manufacturers should stop use of NPs in controlling weeds.

DNA damage is completely totally different from mutation, although every ar forms of error in polymer. polymer damage is Associate in Nursing abnormal chemical structure in polymer, whereas a mutation could also be a modification at intervals the sequence of base pairs. polymer damages cause changes at intervals the structure of the genetic material and prevents the replication mechanism from functioning and enjoying properly. polymer damage and mutation have entirely totally different biological consequences. whereas most polymer damages can endure polymer repair, such repair is not 100 percent economical. Un-repaired polymer damages accumulate in non-replicating cells, like cells at intervals the brains or muscles of adult mammals, and will cause aging. In replicating cells, like cells lining the colon, errors occur upon replication past damages at intervals the guide strand of polymer or throughout repair of polymer damages. These errors can bring forth to mutations or epigenetic alterations. every of these forms of alteration is replicated and passed on to later cell generations. These alterations can modification sequence operate or regulation of natural phenomenon and presumptively contribute to progression to cancer. Throughout the cell cycle there ar varied checkpoints to verify the cell is in condition to succeed in cellular division. the three main checkpoints ar at G1/s, G2/m, and at the spindle assembly stop regulation progression through part of cellular division. G1 and G2 checkpoints involve scanning for broken polymer. Throughout S section the cell could be a ton of liable to polymer damage than the opposite a district of the cell cycle. G2 stop checks for broken polymer and polymer replication completeness. polymer damage is Associate in Nursing alteration at intervals the chemical structure of polymer, sort of a chance throughout a strand of polymer, a base missing from the backbone of polymer, or a chemically changed base like 8-OHdG. polymer damage can occur naturally or via environmental factors. The polymer damage response (DDR) could also be a sophisticated signal transduction pathway that acknowledges once polymer is broken and initiates the cellular response to the harm. damage to polymer that happens naturally might result from metabolic or hydrolytic processes. Metabolism releases compounds that damage polymer moreover as reactive number eight species, reactive gas species, reactive carbonyl species, supermolecule

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peroxidation merchandise and alkylating agents, among others, whereas reaction cleaves chemical bonds in polymer. gift oxidative polymer damages arise a minimum of 10,000 times per cell per day in humans and also the most quantity together hundred,000 per cell per day in rats as documented below. oxidative polymer damage can manufacture over twenty forms of altered bases additionally as single strand breaks. totally different forms of endogeneous polymer damages, given below with their frequencies of incidence, embody depurinations, depyrimidinations, double-strand breaks, O6-methylguanines and C action.

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