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# Transport Therapeutic Active Targeting of Human Brain Tumors Enable Anti–Cancer Nanodrugs Delivery across the Blood–Brain Barrier (BBB) to Treat Brain Diseases Using Nanoparticles and Nanocarriers under Synchrotron Radiation

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## Short Communication

The separation of impurities nano-molecules such as anti–cancer nanodrug molecules, from waste waters is important in nano-medicinal and pharmaceutical industries and human life. Mesoporous molecular sieves, like Al– and Ti–MCM–41 (Mobil Composition of Matter No. 41) materials, offer substantial promise as separations media due to their properties such as a highly regular structure, uniform pore sizes and high surface areas. In this short communication, we want to transport therapeutic active targeting of human brain tumors enable anti–cancer nanodrugs delivery across the Blood–Brain Barrier (BBB) to treat brain diseases using nanoparticles and nanocarriers under synchrotron radiation. For example, Pseudoephedrine hydrochloride ($C_{10}H_{15}ON$, HCl) which is water soluble anti–cancer nanodrug compounds. It widely used as narcotic and highly toxic when it contact with skin and eye, causes various types of allergies– from waste waters with mesoporous materials such as Al– and Ti–MCM–41 (Mobil Composition of Matter No. 41) materials. The revolution of surface characteristic and pore structure of Al– and Ti–MCM–41 (Mobil Composition of Matter No. 41) materials induced by anti–cancer nanodrugs adsorption were characterized based on the analyses of the Nitrogen isotherms, the X–Ray Diffraction (XRD) patterns and $^{1}$HNMR, $^{13}$CNMR, $^{31}$PNMR, Attenuated Total Reflectance Fourier Transform Infrared (ATR–FTIR), FT–Raman, UV–Vis and HR Mass spectra. The adsorption of anti–cancer nanodrugs on Al– and Ti–MCM–41 (Mobil Composition of Matter No. 41) materials with respect to contact time, pH and temperature was then measured to provide more information about the adsorption characteristic of Al– and Ti–MCM–41 (Mobil Composition of Matter No. 41) materials. In this short communication, reports on the synthesis and photo catalytic evaluation of mesoporous sized titania supported Al–and Ti–MCM–41 (Mobil Composition of Matter No. 41) materials by photo degrading Pseudoephedrine hydrochloride ($C_{10}H_{15}ON$, HCl) in the presence of electron acceptors such as Peroxodisulphate (PDS) and $H_2O_2$ using UV and visible–light irradiation. This system is relatively inexpensive, reproducible, extremely stable and efficient in complete degradation of anti–cancer nanodrugs in aqueous solution. In order to obtain maximum information about the performance of Al– and Ti–MCM–41 (Mobil Composition of Matter No. 41) materials catalyst, we did experiments under different operating conditions, *i.e.*, variation of amount of catalyst, concentration of Pseudoephedrine hydrochloride ($C_{10}H_{15}ON$, HCl) and electron acceptors. In addition to the mentioned above, a comparative study on the photo catalytic activities of colloidal $TiO_2$ was also made to transport therapeutic active targeting of human brain

tumors enable anti–cancer nanodrugs delivery across the Blood–Brain Barrier (BBB) to treat brain diseases using nanoparticles and nanocarriers under synchrotron radiation.

Paracetamol (N–acetyl–p–aminophenol, acetaminophen (ACT)) is a long–established and one of the most extensively employed "over the counter" anti–cancer nanodrugs in the world. It was first used in medicine by Von Mering in 1983. It is non–carcinogenic and an effective substitute to aspirin for patients with sensitivity to aspirin. Acetaminophen (ACT) blocks pain messages to the brain by stopping a chemical called prostaglandin, which causes pain and fever. Numerous methods have been used for the determination of paracetamol in pharmaceutical formulations, nanomedicinal and biological fluids including titrimetry, UV–Vis spectrophotometry, spectrofluorimetry, $^{1}$HNMR, $^{13}$CNMR, $^{31}$PNMR, Attenuated Total Reflectance Fourier Transform Infrared (ATR–FTIR), FT–Raman, UV–Vis and HR Mass spectroscopies, electrochemical methods and chromatography. The present short communication describes a rapid and accurate amperometric technique for the determination of acetaminophen (ACT) in nanomedicinal and pharmaceutical preparations and human blood serum, based on electro catalytic oxidation of acetaminophen (ACT) at a glassy Carbon electrode modified by Cadmium pentacyanonitrosylferrare (CdPCNF) film. The electro catalytic response of the modified Gas Chromatography (GC) electrode was linear over the concentration range 2.27 – 63.23 µM. The LOD was found to be 4.84 µM. The method was successfully utilized for the determination of acetaminophen (ACT) in various nanomedicinal, pharmaceutical and biological preparations and the results have been statistically compared with those obtained by the official method. The interference of some nanomedicinal, pharmaceutical and biological nanocompounds was investigated. The results showed that the Nafion–coated CdPCNF/GC electrode can be utilized as a selective amperometric sensor for acetaminophen (ACT) determination in human blood serum. Also, the mean value of rate constant *k* for catalytic reaction and the diffusion coefficient of acetaminophen (ACT) (*D*) in the phosphate buffer solution of pH 7.5 were found to be $5.81 \times 10^{2} M^{-1}s^{-1}$ and $(5.45 \pm 0.75) \times 10^{-6}$ $cm^{2}s^{-1}$, respectively.

Paclitaxel, camptothecin, doxorubicin, cisplatin and curcumin are most used anti–cancer nanodrugs, which are tested for nanomedicinal and pharmaceutical applications. The anti–cancer nanodrugs are mostly encapsulated into the liposomes or micelles or conjugated with Polyethylene Glycol (PEG)[1-73]. They transport therapeutic active targeting of human brain tumors enable anti–cancer nanodrugs delivery across the Blood–Brain Barrier (BBB) to treat brain diseases using nanoparticles and nanocarriers under synchrotron radiation. Paclitaxel, camptothecin, doxorubicin, cisplatin and curcumin are able to transport therapeutic active targeting of human brain tumors enable anti–cancer nanodrugs delivery across the Blood–Brain Barrier (BBB) to treat brain diseases using nanoparticles and nanocarriers under synchrotron radiation. Previous methods for determining paclitaxel, camptothecin, doxorubicin, cisplatin and curcumin have included liquid chromatography, fluorimetry and spectroscopy. Compared to the other techniques, electro analytical methods have the advantages of simplicity, low expense and high sensitivity. In this short communication, we describe the use of ferrocenedicarboxylic acid as a mediator for the electro oxidation of paclitaxel, camptothecin, doxorubicin, cisplatin and curcumin in aqueous media. Also, cyclic voltammetry, differential pulse voltammetry and double potential step chronoamperometry were used to characterize the electrochemical properties of the paclitaxel, camptothecin, doxorubicin, cisplatin and curcumin to investigate its electro catalytic effect on the oxidation of paclitaxel, camptothecin, doxorubicin, cisplatin and curcumin to transport therapeutic active targeting of human brain tumors enable anti–cancer nanodrugs delivery across the Blood–Brain Barrier (BBB) to treat brain diseases using nanoparticles and nanocarriers under synchrotron radiation. The linear dynamic range of the sensors is $6 \times 10^{-7}$M – $3.6 \times 10^{-4}$M with a limit of detection of $11.23 \times 10^{-8}$M. The advantages of this modified electrode are good reproducibility, excellent catalytic activity, simplicity of preparation and especially its antifouling properties towards paclitaxel, camptothecin, doxorubicin, cisplatin and curcumin and their oxidation products to transport therapeutic active targeting of human brain tumors enable anti–cancer nanodrugs delivery across the Blood–Brain Barrier (BBB) to treat brain diseases using nanoparticles and nanocarriers under synchrotron radiation.

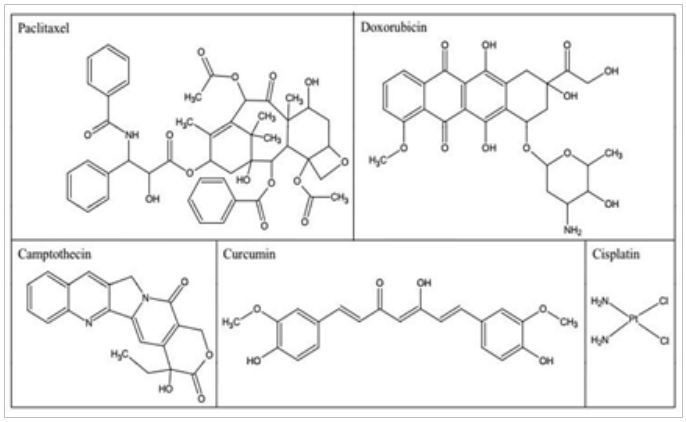


**Figure 1**: Molecular and chemical structures of several most used anti–cancer nanodrugs (paclitaxel, camptothecin, doxorubicin, cisplatin and curcumin), which are tested for nanomedicinal and pharmaceutical applications[1-73].

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