國立台灣大學技術行銷表

台大案號: 06A-101103

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產品/技術名稱	生物可相容性之中孔洞氧化鈦奈米粒子於細胞內影像、藥物傳遞及釋放及磷酸根分子的偵測
發明人/單位	吳嘉文/台灣大學化學工程系，洪辰諭/台灣大學化學工程系，
產品/技術說明	中孔洞氧化鈦奈米粒子(MTN)由於有高度的生物可相容性、大的比表面積以及均一的孔洞大小，我們將合成 MTN 及應用 MTN 在生物相關性的領域。 1.在藥物傳遞方面，本專利證實了裝載抗癌藥(Doxorubicin)的中孔洞氧化鈦奈米材料可以將抗癌藥物運送到人類乳癌細胞並且成功釋放殺死癌細胞。 2.本專利證實了以利用含磷酸根分子作為螢光探針，並且修飾於中孔洞氧化鈦奈米粒子上。基於磷酸根分子互相競爭的特性，這樣的設計可以預測三磷酸腺苷的(ATP)的濃度，進而了解細胞的生理代謝反應。 3.在生物影像方面，官能化的中孔洞氧化鈦奈米粒子可以被應用在生物體內觀測細胞活性。
應用範圍	由於生物可相容性的緣故，這項專利可以被應用在傳遞藥物到我們目標的細胞及組織，其一功能為利用磷酸根對螢光染料分子的競爭，另一功能為追蹤我們有興趣分子循環以及觀察氧化鈦奈米粒子身體代謝機制。
產品/技術優勢	1. 此項專利可以使得抗癌藥物(ex: doxorubicin 細胞膜不可穿透性)可以被備穿過人類乳癌細胞。 2. 此項專利可以藉由物理或化學修飾氧化鈦奈米粒子去標定我們預觀測的生物體內循環。 3. 藉由此項專利，我們可以藉由修飾上磷酸根的氧化鈦奈米粒子去觀測細胞內的活性。
市場潛力	中孔洞氧化鈦奈米粒子具有高度生物相容性及其孔洞結構使其在吸附藥物，用於藥物釋放。此外和磷酸根的高度親和性使得中孔洞氧化鈦奈米粒子可以藉由吞噬作用進入細胞體內後，借此當作我們所關注課題之探針。
產品/技術 智財權保護方式	專利申請中

Marketing Abstract of NTU's Invention Disclosure

NTU's docket no: 06A-101103

Title	**Biocompatible Mesoporous Titania Nanoparticles for Imaging, Drug Delivery, and Phosphate Detection in Living Cells**
Inventor (s)	Chia-Wen Wu, Chen-Yu Hong
Brief Description	（≤ 100 words of non-confidential information） Mesoporous titania nanoparticles (MTNs) with high biocompatibility, large surface area and uniform pore size were synthesized and their biomedical applications were explored. In drug delivery, we demonstrated that an anticancer drug (Doxorubicin)-loaded MTNs could indeed be interalized by live human breast cancer cells. In biosensing, the phosphate-containing fluorescent molecule (called FMN) was used as a fluorescent probe. Based on the different binding strength between FMN to MTNs and other phosphate species (e.g. ATP) to MTNs, we were able to evaluate the concentrations of ATP inside the cells. In bioimage, functionalized FMN-MTNs were also applicable in living cells to observe the cell activity.
Fields of Application	This technique can be applied to deliver anticancer drugs to the desired cells and tissue. Another function is the probe of a phosphorus molecule by competition to the fluorescent dye. The other is to track the the circles what we want to know and observe the metabolism of the titania nanoparticle.
Advantages	(when compared to the existing technologies) This technique can make anti-cancer drug (ex: doxorubicin, the member impenetrable drug) could be token through cell member in human breast cancer cells This technique can be modified by physical or chemical modification to target our object to observe the circle of organism. By using this technique, the cell activity can be studied in variety of situation by the replacement of FMN molecular.
Market Potential	Because of the high biocompatibility and it's pore structure, MTNs play an important role as carrier in drug delivery. MTNs can go into the cytoplasm of the cell by endocytosis in *in-vivo* experiment and as a probe to target our focus study.
IP Right(s)	Patent pending