



# UNIVERSITÀ DEGLI STUDI DI TRIESTE

Rettorato e Direzione Generale  
Ufficio di Staff Industrial Liaison Office

**CHEMISTRY**

**PATENT'S FORM 43**

## **TITLE**

Carbon-Nanotube Modulation of Myocyte Cells

## **PRIORITY DATE**

15/03/2011

## **NUMBER**

PCT/US2012/028930

## **INVENTORS**

Maurizio Prato

## **HOLDERS**

Università degli Studi di Trieste	44%
University of Colorado	34%
ICGEB	22%

## **DESCRIPTION AND APPLICATIONS**

Carbon nanotube scaffolds have been found to promote growth, differentiation and survival of neurons and to modify their electrophysiological properties. We hypothesized that similar effects might be seen in cardiac myocytes, which share several molecular and electrophysiological properties with neurons. For our investigations, we combined microscopy, biological and single-cell electrophysiological methodologies to examine the phenotype of neonatal rat ventricular myocytes (NRVM) cultured on substrates of multiwall carbon nanotubes (MWCNTs) or on gelatin (control). With transmission electron microscopy, we found that NRVM membranes interact with carbon nanotubes by forming tight contacts. Compared to control, NRVM grown on carbon nanotube platforms showed both increased viability and proliferation. Furthermore, we observed changes in the electrophysiological properties of NRVM on carbon nanotubes, suggesting that the MWCNTs may promote cardiac myocyte maturation. These results hold the potential for the development of innovative clinical, pharmacological and tissue engineering applications for carbon nanotube-based devices in cardiac disease.



UNIVERSITÀ  
DEGLI STUDI DI TRIESTE

Rettorato e Direzione Generale  
Ufficio di Staff Industrial Liaison Office

**CHEMISTRY**

**PATENT'S FORM 43**

## **ADVANTAGES**

These findings offer unprecedented perspectives of therapeutic applications in human heart diseases.

## **STATUS**

[http://worldwide.espacenet.com/publicationDetails/biblio?DB=EPODOC&II=0&ND=3&adjacent=true&locale=en\\_EP&FT=D&date=20120920&CC=WO&NR=2012125638A2&KC=A2](http://worldwide.espacenet.com/publicationDetails/biblio?DB=EPODOC&II=0&ND=3&adjacent=true&locale=en_EP&FT=D&date=20120920&CC=WO&NR=2012125638A2&KC=A2)