

# Chapter 11

## Delivery of Drug Payloads to Organs and Organ-Systems



Siew-Wai Pang, Michiele Lee-Kiun Soon, Kamyar Shameli,  
Pushpamalar Janarthanan, and Sin-Yeang Teow

### Contents

11.1	Introduction.....	200
11.2	Utilization of Nanosystems for Drug Delivery.....	200
11.2.1	Inorganic Metallic Nanosystems.....	201
11.2.2	Organic Polymeric Nanosystems.....	202
11.2.3	Biodegradable Nanosystems.....	203
11.3	Modified Drug Nanocarrier for Targeted Delivery.....	203
11.3.1	Antibody-Conjugated Nanocarriers.....	204
11.3.2	Peptide-Linked Nanocarriers.....	205
11.3.3	Nucleic Acid-Linked Nanocarriers.....	205
11.4	Delivery of Drug Payloads to Various Cell Types and Organs.....	206
11.4.1	Cells and Tissues.....	207
11.4.2	Organs and Organ Systems.....	208
11.5	Advanced Modifications of Nanocarrier and Potential Challenges.....	210
11.5.1	Ligand Modifications.....	211
11.5.2	Stimuli-Responsive Modifications.....	211
11.5.3	Limitation of Drug Nanocarrier Development.....	212
11.6	Challenges of Nanodrug Delivery by Different Routes.....	212
11.6.1	Oral Route.....	213
11.6.2	Inhalation route.....	213

---

S.-W. Pang · M. L.-K. Soon · S.-Y. Teow (✉)

Department of Medical Sciences, School of Healthcare and Medical Sciences,  
Sunway University, Bandar Sunway, Selangor, Malaysia  
e-mail: ronaldt@sunway.edu.my

K. Shameli

Department of Chemical and Environmental Engineering (ChEE),  
Malaysia–Japan International Institute of Technology,  
Universiti Teknologi Malaysia, Kuala Lumpur, Malaysia

P. Janarthanan

School of Science, Monash University Malaysia, Bandar Sunway, Selangor, Malaysia

Monash-Industry Palm Oil Education and Research Platform (MIPO),  
Monash University Malaysia, Bandar Sunway, Selangor, Malaysia