

TOXICOLOGICAL ASSESSMENT OF NANOMEDICINE

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12.1 INTRODUCTION

The rapid evolution of nanotechnology has led to the realization of nanomedicine, defined as the use of engineered nanostructures for molecular level monitoring, repair, construction, and control of human biological systems [1]. Projections indicate that the nano pharmaceutical market will reach US\$180 billion by 2015 [2]. Nanomedicine has originally focused on drug delivery and the treatment of cancer; however, new applications are emerging such as vaccine adjuvants, medical imaging, and gene therapy, the latter being applicable to a wide range of therapies ranging from Parkinson's disease treatment to osteogenesis [3]. The potential of nanotechnology to improve medicine is not limited to the use as a vehicle for medicines but also applicable for streamline discovery, design, development, and production of medications. These advances may reduce the time it takes to move a medicine from the bench to the clinic (currently 8–14 years) and the cost (current average of US\$1.8 billion) [4]. On the other hand, the abundant use of and exposure to nanomaterials naturally raises