# Chapter 8
# Unveiling Nano-Specific Toxicity: Empowering Medical Literacy and Exploring Its Connection to Autophagy

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## ABSTRACT

*This chapter explores the misconception surrounding nano-specific toxicity and emphasises the critical role of improved medical literacy in addressing this issue. By delving into the realm of nanotechnology and its potential health implications, this study highlights the importance of accurate information dissemination and education to dispel unfounded fears. Through enhanced medical literacy, stakeholders can navigate the complexities of nano-toxicity concerns more effectively, paving the way for informed decision-making and fostering a deeper understanding of nanomaterials' true impact on health and well-being. Furthermore, this chapter delves into the fascinating relationship between nano-specific toxicity and autophagy, unveiling insights that could have profound implications for both medicine and nanotechnology. The authors have also discussed the potential connection between fasting and medical understanding of autophagy.*

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## INTRODUCTION

Nanotechnology refers to the scientific and technological study of objects that are small in size (Sahu et al., 2023). In reality, nanotechnology refers to any technology operating at the nanoscale, which boasts numerous practical applications across various real - world domains (Nasrollahzadeh, Sajadi, Sajjadi, & Issaabadi, 2019) such as cognitive health (Bi, Po, & Uludag, 2025). Nanotechnology's rapid advancement necessitates rigorous nanotoxicology research to assess and mitigate the potential health and environmental risks of engineered nanomaterials. Nanotoxicology is a rapidly evolving field, yet it is often surrounded by myths and misconceptions that can obscure the true nature of the risks and benefits associated with nanomaterials (Rahman, Rahman, Parvez, & Kim, 2023). These misunderstandings can mislead public perception of nanomaterials and hinder the rational development and application of this emerging field. Nanomaterials derived from nanotechnology have initiated an exciting era of technology that will influence every facet of human existence (Patel et al., 2021). They frequently demonstrate distinctive characteristics and are intriguing across a range of scientific disciplines, such as biomedicine (Erisen & Uludag, 2024). These objects possess unique physical and chemical characteristics. Nanotechnology encompasses advancements and progress in the atomic, molecular, and macromolecular domains, which have the potential to influence a nation's competitive edge significantly (Ibrohim et al., 2023). Its advancements in atomic, molecular, and macromolecular domains serve as a multiplier of national power in economics, technology, and security. By learning from history's successes and failures, nations can position nanotechnology as a driver of inclusive, sustainable competitiveness—avoiding the pitfalls of unaccountable expertise while harnessing the power of evidence-driven progress. Previously, medical professionals would make decisions about medical diagnosis, prevention, and treatment based on the opinions of authoritative experts. These experts would rely on their own experiences, intuition, and reputation rather than conducting a thorough evaluation of causal relationships and utilizing evidence-based criteria. This approach was prevalent in the medical field during that time (Guzelian et al., 2005). This approach had both advantages and disadvantages. On one hand, it allowed experienced practitioners to rely on their own judgment and expertise, which could be valuable in complex and unique cases. However, it also meant that medical decision-making lacked a standardized and rigorous approach, and there was limited accountability for the accuracy and effectiveness of treatments. Drawing lessons from historical shifts in medical decision-making—where expertise evolved from authority-based to evidence-driven—nations must guide nanotechnology's advancement through rigorous, evidence-based frameworks that balance innovation with accountability,