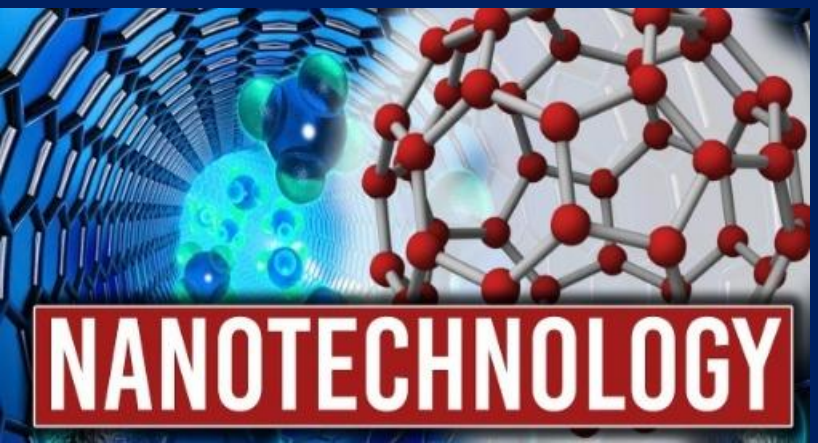
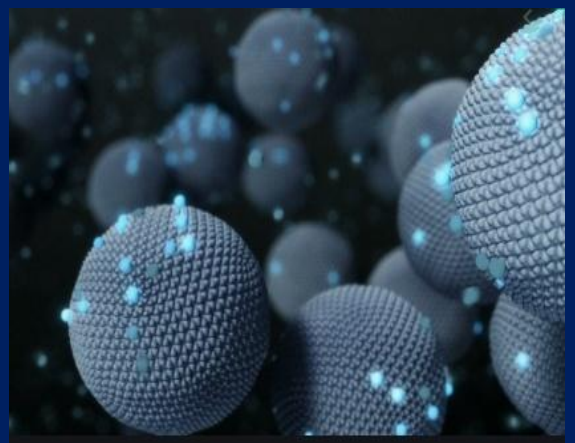
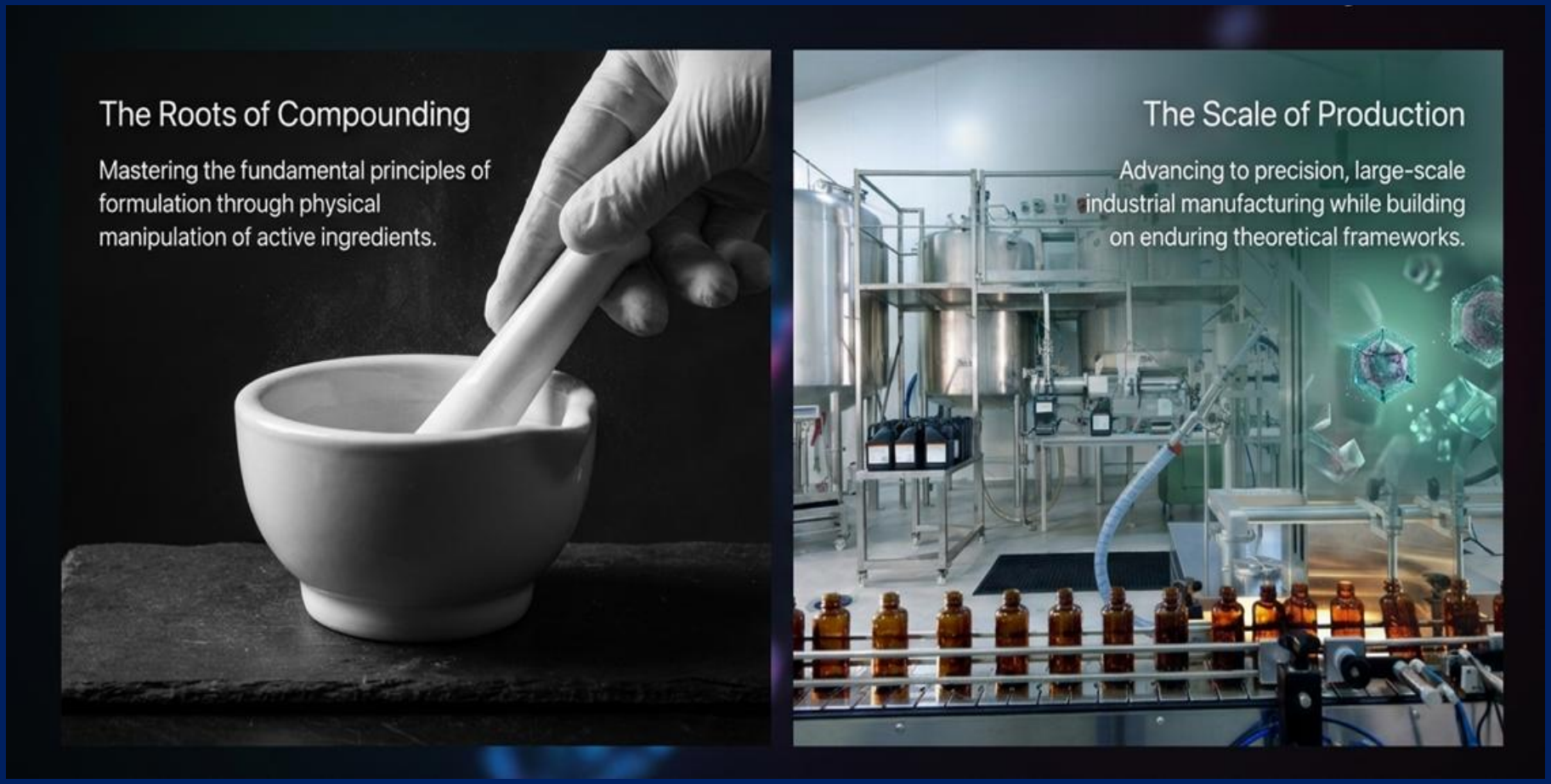
Department of Pharmaceutics and Industrial Pharmacy
Faculty of Pharmacy
Ain Shams University





The foundational cores of Department of Pharmaceutics and Industrial Pharmacy



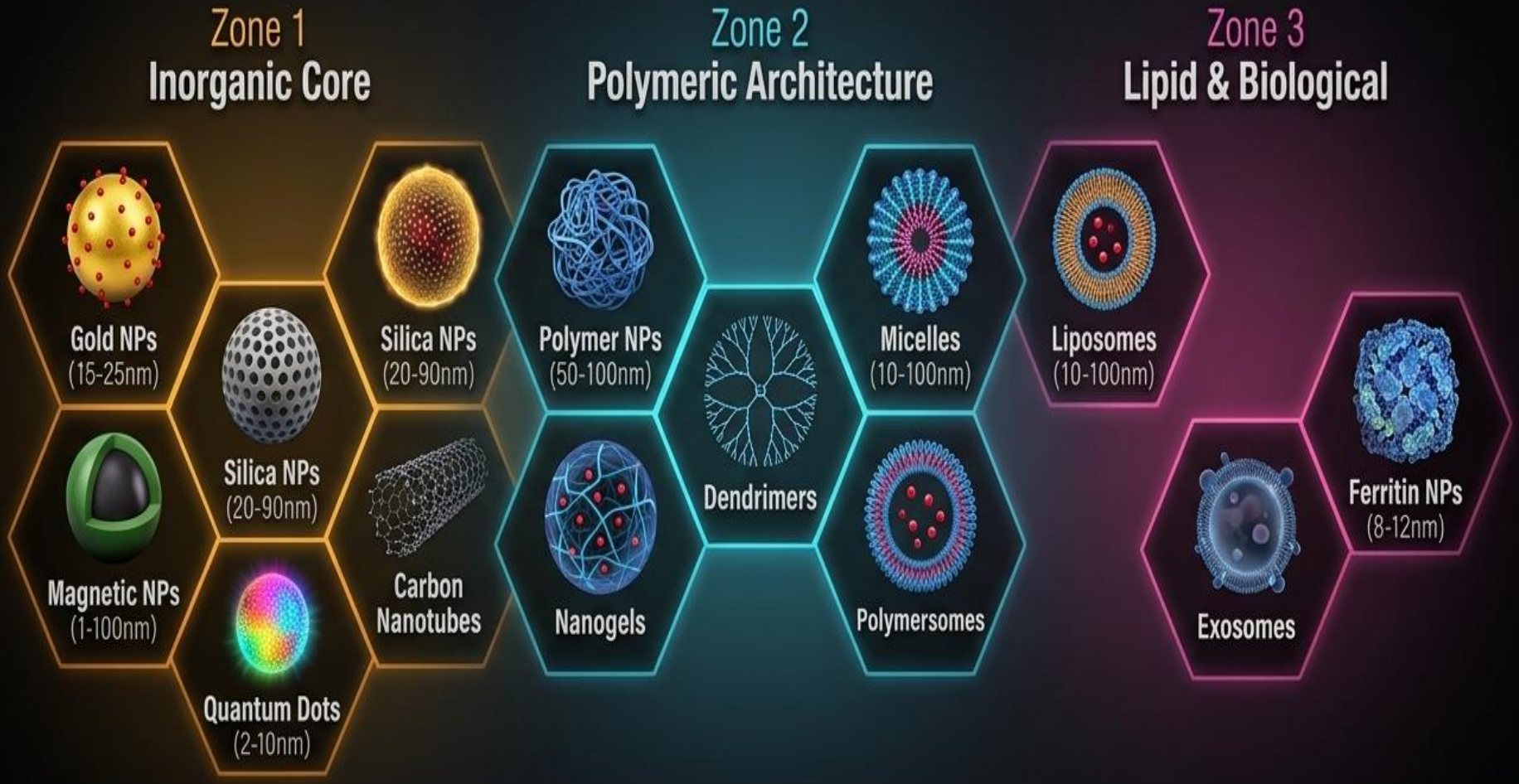
The Delivery Paradigm Shift

Conventional Formulations

Advanced Drug Delivery Systems (DDS)

Conventional Formulations		Advanced Drug Delivery Systems (DDS)
Systemic and widespread distribution	Mechanism of Action	Targeted, high-precision binding
Passive absorption, hindered by natural barriers	Penetration Strategy	Active evasion via biomimetic architecture
Static, immediate, or sustained release	Responsiveness	Dynamic, stimuli-responsive deployment (Heat, pH, Enzymes)
Pills, standard vials, topical creams	Paradigmatic Form	Liposomes, Core-Shell Nanoparticles, Nanobots

The Ain Shams Arsenal: A Taxonomy of Nanocarriers

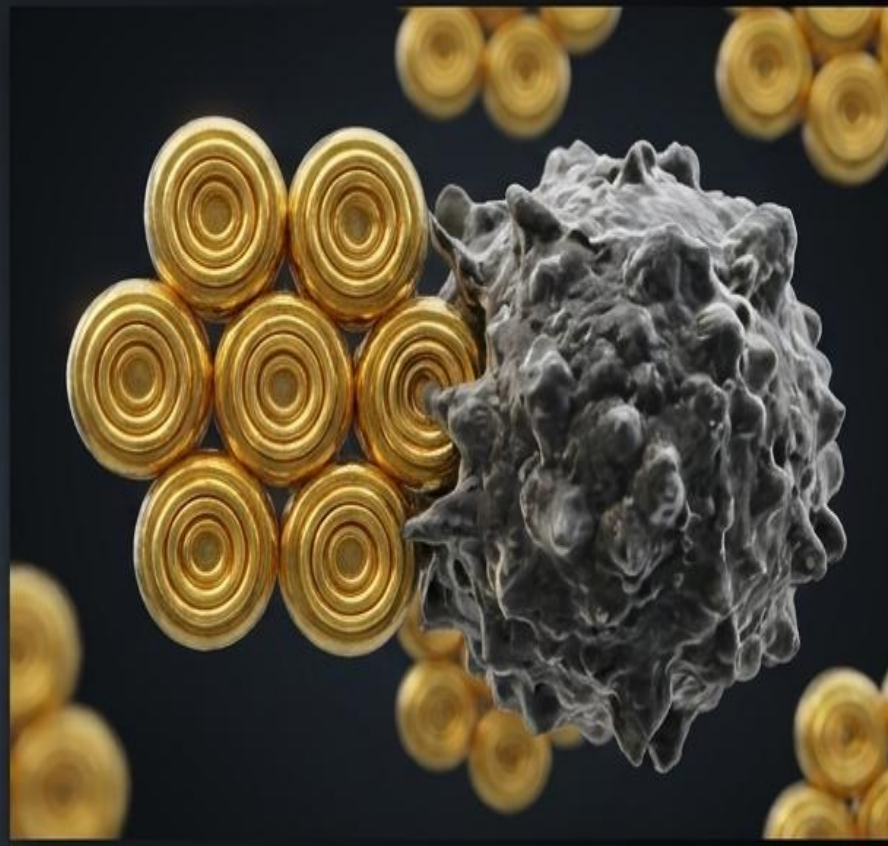


From quantum dots to bimetallic nanoalloys, the department custom-selects the carrier's physical scale and material properties to perfectly match the clinical payload.

Drug Targeting: The Magic Bullet

The Reticle

Engineering nanocarriers to bypass healthy tissue and lock exclusively onto the surface receptors of diseased cells.



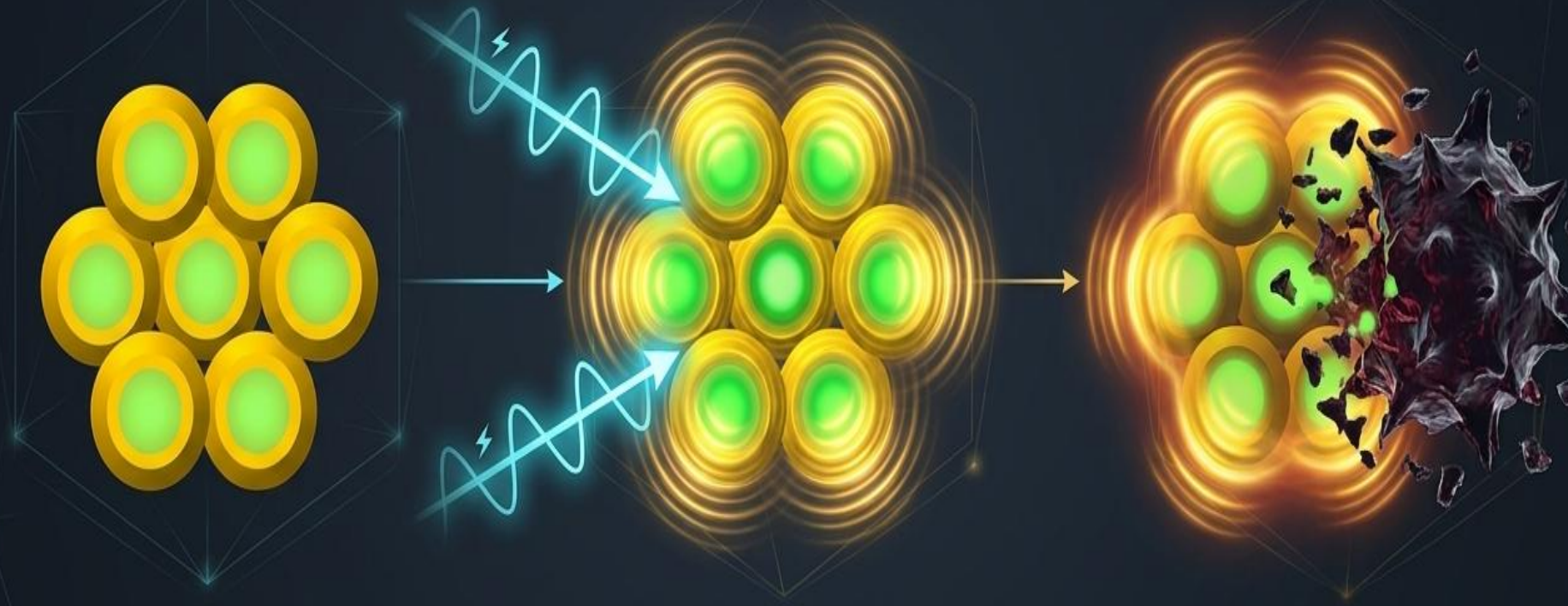
Helping the Beauty Cure the Beast

Utilizing elegantly designed, geometrically perfect nanostructures to deliver devastating anti-cancer agents to malignant tumors.

Nano-Onco-Immunotherapy

Plasmonic Photothermal Therapy: “Curing the Beast”

The Beauty → The Trigger → Curing the Beast



The Beauty → The Trigger → Curing the Beast

Gold Nanoparticle with Green Anti-Cancer Payload

Cyan Light Excitation induces Surface Plasmon Resonance (SPR)

Localized Plasmonic Heat Dissolves Tumor Cell, Sparing Healthy Tissue

Issue 3, 2006

Previous Article | Next Article

From the journal:
Chemical Society Reviews

Why gold nanoparticles are more precious than pretty gold: Noble metal surface plasmon resonance and its enhancement of the radiative and nonradiative properties of nanocrystals of different shapes

Susie Eustis [a] and Mostafa A. El-Sayed *[a]

Ppy-coated Gold NPs

Helping the beauty to beat “cure” the beast

What if the developed system was loaded with an anti-cancer agent? .....

triple impact

Stimuli-Responsive Architectures

1. Dormant Transit

Polymer matrices encapsulate and protect the therapeutic payload from premature degradation in the systemic circulation.

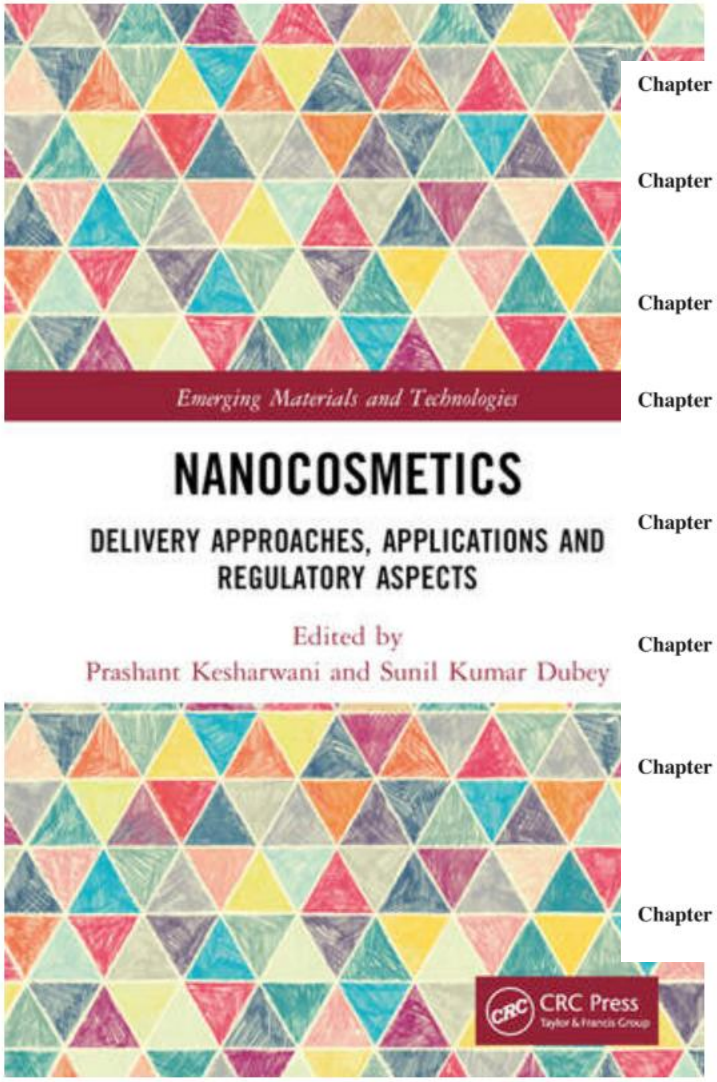
2. Environmental Trigger

The carrier encounters a specific localized stimulus engineered into its chemical design, such as hyperthermia, acidic shifts, or enzymatic presence.

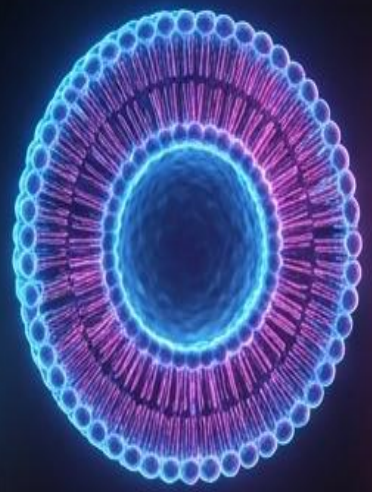
3. Precision Deployment

The polymer dynamically alters its structure—swelling, dissolving, or cleaving bonds—to deploy the agent exactly at the highly acidic tumor microenvironment.

Nanocosmetics



Engineering the Cosmetic Nanoscale



Vesicular Systems

Liposomal and Niosomal delivery networks designed for deep epidermal integration.

Polymeric & Micellar

Polymeric micelles and dendrimer architectures for highly stable formulations.

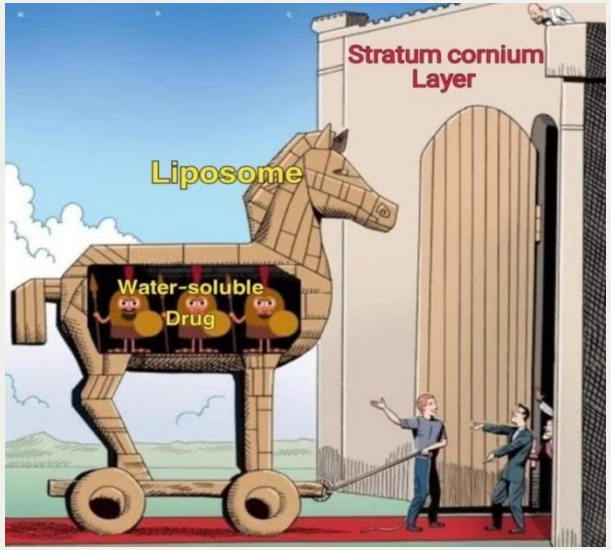
Emulsions & Lipids

Nanoemulsions and solid lipid nanoparticles for enhanced barrier repair and moisture retention.

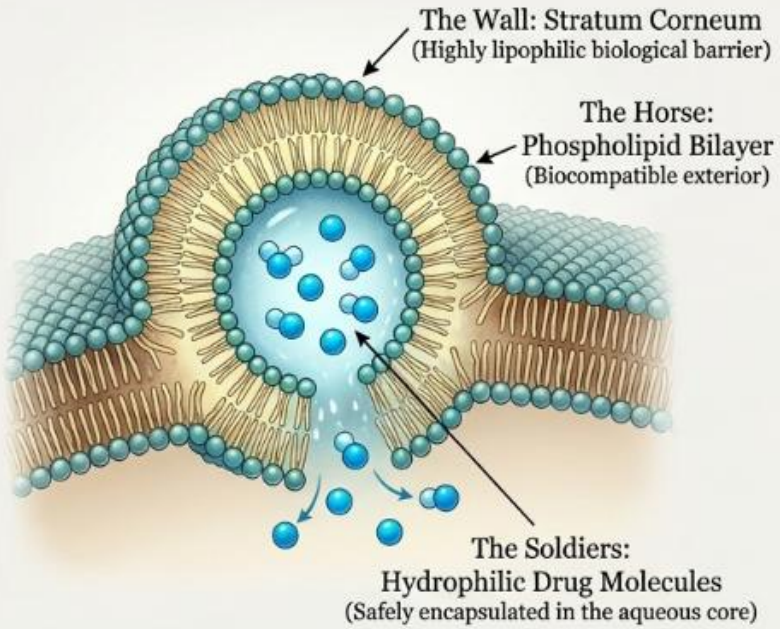
Metallic & Novel

Nanosilver, nanogold, and nanostructured organic UV filters, paving the way for advanced Nanoperfumes.

Bypassing Biological Fortresses



The Strategy: Disguising water-soluble payloads inside lipid-friendly vehicles.



Overcoming the fundamental barrier of transdermal and localized delivery without compromising the active pharmaceutical ingredient.

Nano-onco-immunotherapy

gels

MDPI

Article

Enhancing Effector Jurkat Cell Activity and Increasing Cytotoxicity against A549 Cells Using Nivolumab as an Anti-PD-1 Agent Loaded on Gelatin Nanoparticles

Dalia S. Ali [1], Heba A. Gad [2,3] and Rania M. Hathout [2,*]

[1] Department of Biotechnology, Central Administration of Biological, Innovative Products and Clinical Studies, Egyptian Drug Authority, Giza 11566, Egypt
[2] Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Ain Shams University, Cairo 11566, Egypt
[3] Pharmacy Program, Department of Pharmaceutical Sciences, Batterjee Medical College, Jeddah 21442, Saudi Arabia
* Correspondence: r_hathout@yahoo.com or rania.hathout@pharma.asu.edu.eg

Green synthesis of drug-loaded NPs

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Carbohydrate Polymers

Volume 324, 15 January 2024, 121526

Wound healing potential of silver nanoparticles embedded in optimi bio-inspired hybridized chitosan sc and dry hydrogel

Roxane Abdel-Gawad, Rihab Osman, Gehanne A.S. Awad, Nahed Mort

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Enhancing Polyacrylonitrile Nanofibers Antiviral Activity Using Greenly Synthesized Silver Nanoparticles

Merna H. Emam, Reham S. Elezaby, Shady A. Swidan, Samah A. Loutfy, Rania M. Hathout

First published: 01 April 2025 | https://doi.org/10.1002/ardp.202400943 | Citations: 1

Development of new drug delivery systems at the department

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uary 2026, 126370

Volume 27, January 2023, 101266

Tripodal amphiphilic pseudopeptidic nanovesicles as *p*-coumaric acid delivery systems for brain cancer cells

anomedicine: ed chitosomes for hypertension

A.H. Lotfallah [a], J.J. Andreu [b], R.M. Hathout [c], D.H. Kassem [d], S.S. Ibrahim [c], B. Altava [b], E. García-Verdugo [b], S.V. Luis [b]

haimaa S. Ibrahim [b], Enas Elmowafy [b],

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Archives of Pharmaceutical Sciences Ain Shams University 2026; Vol. 10(1): 17-26

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Pharmaceutics and Industrial Pharmacy

Editorial

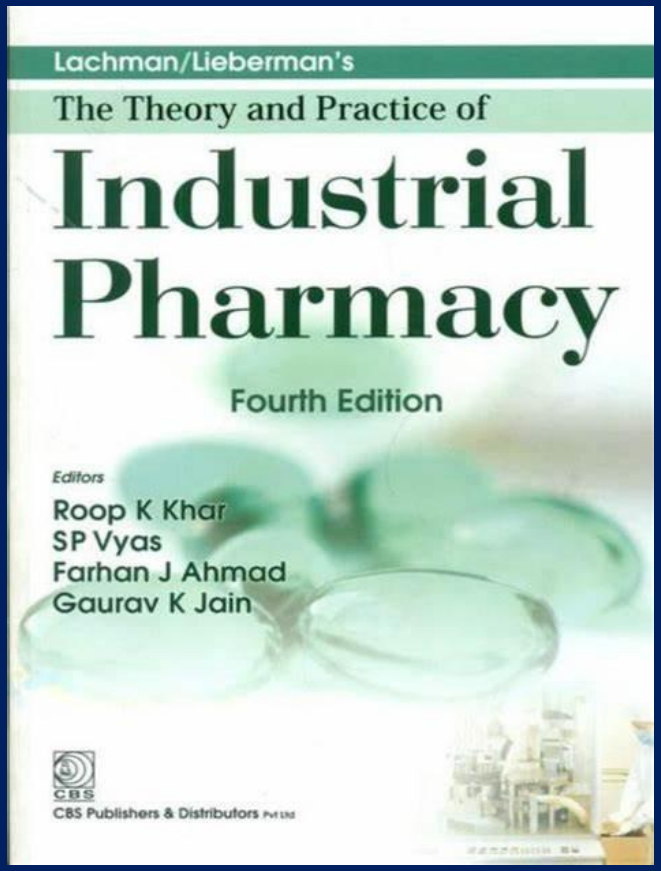
Spanning a quarter century: Tales of three inspiring Nobel prizes that enriched the drug delivery field

Rania M. Hathout[a*], **Ahmed G. A. Abdelhamid**[b]

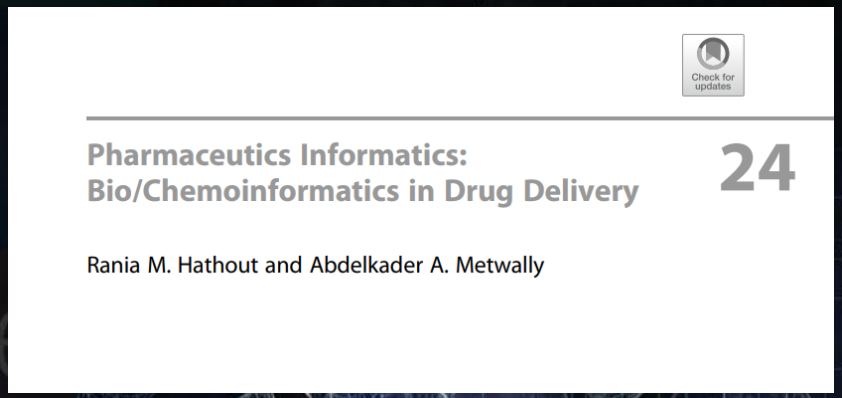
[a]*Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Ain Shams University, Cairo 11566, Egypt*

[b]*Université de Grenoble-Alpes, Institute for Advanced Biosciences, INSERM U1209, CNRS UMR 5309, Grenoble, France*

Industrial Pharmacy and Pharmaceutical Technology



The Digital Frontier: Computational Pharmaceutics



Bio/Chemoinformatics

Utilizing advanced algorithms to model drug-receptor interactions and optimize delivery pathways in silico before physical trials begin.

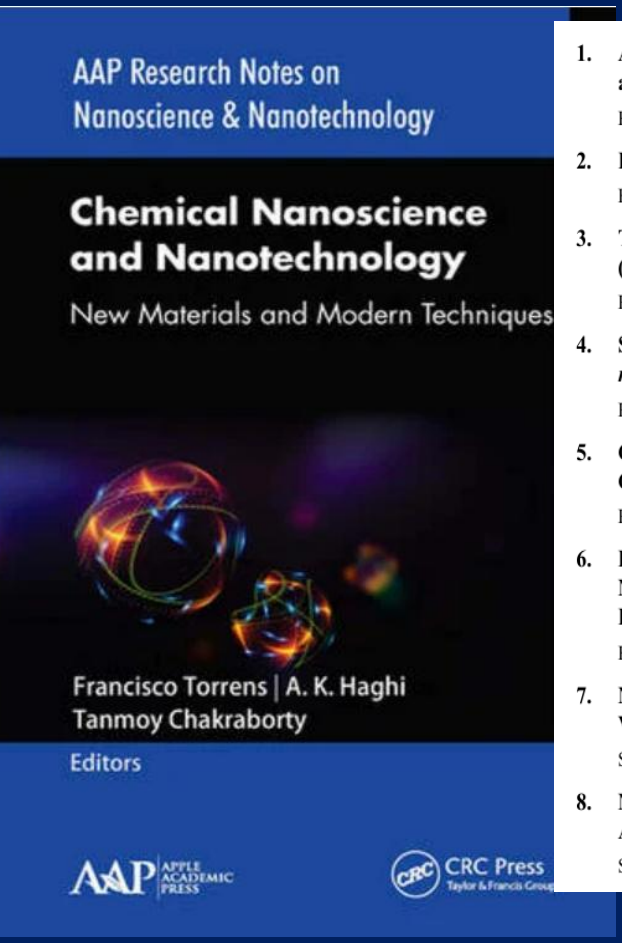
Artificial Intelligence

Deploying sophisticated AI frameworks to accurately predict the behavior, systemic toxicity, toxicity, and release kinetics of complex delivery architectures.

Molecular Simulation

Advancing chemical engineering by simulating the precise physical properties of bimetallic trimers and three-dimensional reconstructions of nanofibrous membranes.

Nanoscience and Nanotechnology



Architecting the Minds: Educational Research

Research Methodology & Ethics

Establishing rigorous, globally minded standards and ethical frameworks for the next generation of pharmaceutical scientists.

Quality by Design (QbD)

Embedding the principles of Design of Experiments (DoE) into student curricula, shifting paradigms from trial-and-error to systematic, statistically driven formulation.

Transdisciplinary Teaching

Fostering multidisciplinary, interdisciplinary, and transdisciplinary chemistry activities in higher education to build well-rounded, innovative thinkers.