Publications Template

#	Research Title	Field	Abstract	Year of Publication Publishing	Publishing Link "URL"
1	Topical amlodipine-loaded solid lipid nanoparticles for enhanced burn wound healing/ A repurposed approach	Pharmaceutics	Burn wounds are a complicated process with ongoing psychological and physical issues for the affected in-dividuals. Wound healing consists of multifactorial molecular mechanisms and interactions involving; inflam-mation, proliferation, angiogenesis, and matrix remodeling. Amlodipine (ADB), widely used in cardiovascular disorders, demonstrated antioxidant and anti-inflammatory effects in some non-cardiovascular studies. It was reported that amlodipine is capable of promoting the healing process by regulation of collagen production, extracellular matrix, re-epithelialization and wound healing through its vasodilation and angiogenic activity. The	2024	https://doi.org/10.1016/j.ijpharm.2024.124484

			objective of the current study is to appraise the wound healing capacity of amlodipine-loaded SLN (ADB-SLN) integrated into a hydrogel. The in-vitro characterization revealed that the optimized formulation was nanometric (190.4 ± 1.6 nm) with sufficiently high entrapment efficiency (88 % ± 1.4) and sustained ADB release (85.45 ± 4.45 % after 12 h). Furthermore, in-vivo evaluation was conducted on second-degree burns induced in male Sprague-Dawley rats. ADB-SLN gel revealed a high wound contraction rate and a significant improvement in skin regeneration and inflammatory biomarkers levels, confirming its efficiency in enhancing wound healing compared to other tested and commercial formulations. To conclude, the present findings proved that ADB-SLN integrated hydrogel offers a promising novel therapy for burn wound healing with a maximum therapeutic value.		

2	Preparation and evaluation of vaginal suppo-sponges loaded with benzydamine in-vitro in-vivo study	Pharmaceutics	This study aimed to design a new Benzydamine HCl (BNZ) suppo-sponge for controlled, mucoadhesive dosage form for vaginal candidiasis treatment, offering advantages over traditional creams, ointments, or gels. BNZ-loaded suppo-sponges were fabricated by simple casting / freeze-drying technique utilizing the cross-linking of chitosan (Cs) with vanillin (V). Vaginal suppo-sponges were prepared based on different vanillin cross-linking ratios (V).n), from 0 to 2%w/w. To best of our knowledge, this is the first study that uses Schiff's base between chitosan and vanillin as a drug delivery system to treat fungal vaginal infections. Schiff's base formation was confirmed by FT-IR. In-vitro appraisal showed acceptable physical and mechanical characteristics. Formulations based on cross-	2024	https://doi.org/10.1080/10837450.2024.2306803

			linking of Cs with V showed a more pronounced in-vitro antifungal activity. In-vitro drug release revealed a prolonged release pattern, becoming more noticeable with the higher cross-linked suppo-sponges (22.34% after 8 h). In-vivo testing of CsV2 suppo-sponge indicated a more pronounced reduction in fungal count than both CsV0 and TantumV R Rosa in the first week, with a peak reduction on day 7 and the 10th and 11th days of the second week. Conclusively, Chitosan/vanillin suppo-sponges represent a promising delivery system for drugs intended for local treatment of vaginal candidiasis. than both CsV0 and TantumV R Rosa in the first week, with a peak reduction on day 7 and the 10th and 11th days of the second week. Conclusively, Chitosan/vanillin suppo-sponges		

			represent a promising delivery system for drugs intended for local treatment of vaginal candidiasis.		
3	Propolis-loaded nanostructured lipid carriers halt breast cancer progression through miRNA-223 related pathways/ an in-vitro/ in-vivo experiment	Pharmaceutics	The most frequent malignant tumor in women is breast cancer, and its incidence has been rising every year. Propolis has been used for its antibacterial, antifungal, and anti-inflammatory properties. The present study aimed to examine the effect of the Egyptian Propolis Extract (ProE) and its improved targeting using nanostructured lipid carriers (ProE-NLC) in Ehrlich Ascites Carcinoma (EAC) bearing mice, the common animal model for mammary tumors. EAC mice were treated either with 5-fluorouracil (5-FU), ProE, ProE-NLC, or a combination of ProE-NLC and 5-FU. Their effect on different inflammatory, angiogenic, proliferation and apoptotic markers, as well as miR-223, was examined. ProE and ProE-NLC have shown potential anti-breast cancer	2023	https://doi.org/10.1038/s41598-023-42709-7

			activity through multiple interrelated mechanisms including, the elevation of antioxidant levels, suppression of angiogenesis, inflammatory and mTOR pathways, and induction of the apoptotic pathway. All of which is a function of increased miRNA-223 expression. The efficiency of propolis was enhanced when loaded in nanostructured lipid carriers, increasing the effectiveness of the chemotherapeutic agent 5-FU. In conclusion, this study is the first to develop propolis-loaded NLC for breast cancer targeting and to recommend propolis as an antitumor agent against breast cancer or as an adjuvant treatment with chemotherapeutic agents to enhance their antitumor activity and decrease their side effects. Tumor targeting by ProE-NLC should be considered as a future therapeutic perspective in breast cancer.		

4	Pentoxifylline/Valsartan co-delivery in liposomal gel alters the inflammatory HMGB-1/ TLR pathway and promotes faster healing in burn wounds: A promising repurposed approach.	Pharmaceutics	Burn wounds are one of the most severe complex forms of trauma. Hence, new treatment strategies that facilitate the healing process; reduce the severity and the healing time is the main concern of the health care systems. In this work, pentoxifylline-valsartan, (PTX- VAL), loaded liposomes integrated into gel were designed for the first time as a novel co-delivery carrier for the treatment of burn wounds. The objective of this work was to investigate the ability of the nano-based liposomal system to co-entrap two repurposed drugs; hydrophilic pentoxifylline and lipophilic valsartan for topical treatment of burn wounds. The impact of increasing the phospholipid amount to enhance the co-entrapment of PTX and VAL was investigated and in-vitro evaluation of the prepared formulations was conducted to choose the optimum composition with the	2022	https://doi.org/10.1016/j.ijpharm.2022.122129

			highest entrapment of both drugs adopting a simple, reliable derivative spectrophotometric method. Structure elucidation was also performed using a transmission electron microscope. In addition, A simple selected derivative spectrophotometric method was developed for the assay of PTX-VAL novel combination. The proven selectivity, precision and accuracy assured the reliability of this analytical method. Being economic and fast makes routine application of the developed analytical method is recommended in pharmaceutical industry. The selected liposomal formulation integrated into gel matrix (PTX-VAL-LG) showed; nanometric size, acceptable entrapment efficiency of both PTX and VAL as well as sustained release profiles and thus, enhanced action.		

5	Hyaluronic-benzydamine oromucosal films outperform conventional mouth rinse in ulcer healing.	Pharmaceutics	Oral mucositis is an ulcerative inflammation that is commonly encountered in patients receiving radio- and chemotherapy as an acute side effect. Local benzydamine (Bnz) application suppresses inflammation, while hyaluronic acid (HA) aids ulcer healing. In this study, Bnz-HA, a triple-layer oromucosal film, was developed for fast localized treatment of oral mucositis, compared to conventional formulations, with the aim to prolong Bnz retention onto the affected area and enhance its therapeutic efficacy by HA incorporation. The Bnz-HA films comprised a mucoadhesive-layer, containing HA and HPMC 4000, that adheres to the oral mucosa and controls Bnz release from the middle drug-layer, which was, in turn, adhered to a backing-layer containing Eudragit RS and allowing unidirectional drug release. Similarly, Bnz films were	2021	https://doi.org/10.1016/j.jddst.2021.102690

			prepared omitting the HA addition. The films were characterized for their mucoadhesion, swelling capacity and in vitro drug release. The extent and duration of ulcer healing after 5 days film application were recorded in vivo using oral ulcer rabbit model. Bnz-HA and Bnz films showed strong mucoadhesion, maximum swelling after 2 h and a controlled drug release over 12 h. However, the incorporation of HA in Bnz-HA films significantly enhanced ulcer healing, outperforming the Bnz film and Tantum-Verde® mouth rinse. Conclusively, Bnz-HA films control Bnz release, reduce the dosing frequency and achieve rapid ulcer healing, hence being a promising delivery system outperforming conventional oral rinse.		
6	PEGylated Liquisomes: A Novel Combined Passive Targeting	Pharmaceutics	PEGylated Liquisomes (P-Liquisomes), a novel drug delivery system was designed	2021	https://doi.org/10.1016/j.ijpharm.2021.120666

	Nanoplatform of L-carnosine for Breast Cancer.		for the first time by incorporating phospholipid complex in PEGylated liquid crystalline nanoparticles (P- LCNPs). L-carnosine (CN), a challenging dipeptide, has proven to be a promising anti-cancer drug. However, it exhibits high water solubility and extensive in-vivo degradation that halts its use. The objective of this work was to investigate the ability of our novel system to improve the CN anticancer activity by prolonging it's release and protecting it in-vivo. In-vitro appraisal revealed spherical light-colored vesicles encapsulated in the liquid crystals, confirming the successful formation of the combined system. P-Liquisomes were nano-sized (149.3 ± 1.4 nm), with high ZP (-40.2 ± 1.5 mV), complexation efficiency (97.5 ± 0.9 %) and outstanding sustained release of only 75.4 % released after 24 h, compared to P-LCNPs and Phytosomes. The results obtained with P-Liquisomes are considered as a		

			break through compared to P-LCNPs or Phytosomes alone, especially when dealing with the hydrophilic CN. In-vitro cytotoxicity evaluation, revealed superior cytotoxic effect of P-Liquisomes (IC50 = 25.9) after 24 h incubation. Besides, P- Liquisomes proved to be non-toxic in-vivo and succeeded to show superior chemopreventive activity manifested by reduction of; % tumor growth (7.1%), VEGF levels (14.3 pg/g tissue), cyclin D1 levels 15.5 ng/g tissue and elevation in caspase-3 level (36.4 ng/g tissue), compared to Phytosomes and CN solution. Conclusively, P-Liquisomes succeded to achieve the maximum therapeutic outcome of CN without altering its activity and might be used as a sustained delivery system for other promising hydrophilic compounds.		
7	Valsartan solid lipid nanoparticles integrated hydrogel: A	Pharmaceutics	The article presents an experimental study on the	2021	https://doi.org/10.1016/j.ijpharm.2020.120091

	challenging repurposed use in the treatment of diabetic foot ulcer, in-vitro/in-vivo experimental study.		possible repurposed use of valsartan (Val), in the local treatment of uncontrolled diabetic foot ulcer. Solid lipid nanoparticles (SLN), loaded with Val were prepared by applying 32 full factorial design using modified high shear homogenization method. The lipid phase composed of Precirol® ATO 5 (P ATO 5) and/or Gelucire 50/13 (G 50/13) in different ratios and a nonionic emulsifier, Pluronic 188 (P188), was used in different percentages. Optimized formulation was further integrated in hydroxyl propyl methyl cellulose (HPMC) gel for the ease of administration. In-vitro and in-vivo characterizations were investigated. The prepared nanoparticles showed small particle size, high entrapment efficiency and sustained drug release. Microbiologically, Val-SLN showed a prominent decrease in the biofilm mass formation for		

			both gram-positive and gram-negative bacteria, as well as a comparable minimum inhibitory concentration level to levofloxacin alone. Diabetes was induced in 32 neonatal Sprague-Dawley rats. At 8 weeks of age, rats with blood sugar level >160 were subjected to surgically induced ulcer. Treatment with Val-SLN for 12 days revealed enhanced healing characteristics through cyclooxygenase-2 (COX-2), nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB), nitric oxide (NO), transforming growth factor-beta (TGF-β), matrix metalloproteinase (MMPs) and vascular endothelial growth factor (VEGF) pathways. Histological examination revealed re-epithelization in Val-SLN treated ulcer, as well as decrease in collagen using trichrome histomorphometric analysis.		

8	Evaluation of chamomile oil and nanoemulgels as a promising treatment option for atopic dermatitis induced in rats.	Pharmaceutics	Background: Atopic dermatitis is a chronic inflammatory skin disease that remarkably affects the quality-of-life of patients. Chamomile oil is used to treat skin inflammations. We evaluated the efficacy of chamomile oil and nanoemulgel formulations as a natural alternative therapeutic option for atopic dermatitis. Research design and methods: Formulations were developed comprising chamomile oil: olive oil (1:1), Tween 20/80 or Gelucire 44/14 as surfactant-cosurfactant mixtures, propylene glycol (10%w/w), water and hydroxypropyl methylcellulose (3%w/w). In-vitro physicochemical characterization, stability testing and in-vivo assessment of inflammatory biomarkers and histopathological examination of skin lesions were conducted in rats induced with atopic dermatitis. Results: Nanoemulgels G1 and X1 which displayed the smallest particle size of 137.5 ± 2.04 and	2020	https://doi.org/10.1080/17425247.2020.1699054

			207.1 ± 5.44 nm, good homogeneity and high zeta-potential values of –26.4 and –32.7 mV were selected as the optimized emulgel. Nanoemulgels were nonirritating of pH value 5.56, readily spread-able, and were physically stable following 10 heating-cooling cycles. Treatment with nanoemulgels showed a two-fold decrease in duration of skin healing and no spongiosis compared to chamomile oil. Levels of biomarkers were reduced after topical application of both nanoemulgels and chamomile oil. Conclusion: Nanoemulgels are a potential cost effective, safe topical carrier system for chamomile in treating atopic dermatitis.		
9	Controlled release Ibu-cryobarriers for the prevention of post-operative adhesions: In-vitro/in-vivo comparative study.	Pharmaceutics	Post-operative adhesion is a common cause of several complications including intestinal obstruction, chronic pelvic pain and/or infertility. Adhesions are fibrous bands that result from the inflammatory	2019	https://doi.org/10.1016/j.ijpharm.2019.04.081

			reactions due to peritoneum damage. The current study focused on designing an effective anti-inflammatory loaded barrier for the prevention of post-operative adhesions. The proposed method is based on the use of polyvinyl alcohol (PVA), cryobarrier loaded with Ibuprofen (Ibu). Anti-adhesive Ibu-cryobarriers were prepared in different forms, and subjected to in-vitro evaluation comprising; drug release rate, maximum swelling index, morphological ex- amination using scanning electron microscope (SEM), fourier-transform infrared spectroscopy (FTIR) and me- chanical properties. Optimized cryobarriers were further investigated for their in-vivo effectiveness in pre- venting post-operative adhesions in female Sprague-Dawley rats. All formulations showed appropriate physical and morphological characteristics, in-vitro controlled sustained drug release profiles during a		

			period of seven days with acceptable maximum swelling index. Invivo, all cryobarriers were equivalent to each other concerning serum or tissue parameter. However, morphological and histopathological evaluations revealed that both xer-ocryogel and lyophilized cryofilms are more effective than the cryogel in prevention of post-operative peritoneal adhesions. The current study showed the possibility of preparing drug loaded cryobarriers using simple tech-nique with an effective in vivo post-operative adhesion prevention.		
10	Nanostructured lipid carriers for intraocular brimonidine localization: development, in-vitro and in-vivo evaluation.	Pharmaceutics	Brimonidine ocular hypotensive effect can be enhanced by increasing residence time and corneal penetration. The current work aimed to formulate, evaluate and compare nanostructured lipid carriers (NLCs) to solid lipid nanoparticles (SLNs) and commercial eye drops for	2018	https://doi.org/10.1080/02652048.2018.1425753

			controlled brimonidine delivery. NLCs prepared by modified high shear homogenisation were spherical with a mean size of 151.97±1.98nm, negative zeta potential (ZP) of 44.2±7.81mV, % entrapment efficiency (EE) of 83.631 ± 0.495% and low crystallinity index (CI) (17.12%), indicating a better drug incorporation. Moreover, they kept stable during storage at 4 C for 3months. Permeability coefficient of NLCs was 1.227 folds higher than that of SLNs. Histological examin- ation revealed localisation of NLCs in the anterior ocular chamber. NLCs revealed the most sus- tained and highest intraocular pressure (IOP) lowering activity (13.14±1.28mmHg) in rabbits. In conclusion, NLCs is a promising approach for IOP reduction compared to eye drops and SLNs.		
11	Nanotechnology-based drug delivery systems for Alzheimer's disease management:	Pharmaceutics	Alzheimer's disease (AD) is a neurodegenerative disease with high prevalence in the rapidly growing elderly population in	2017	http://dx.doi.org/10.1016/j.jconrel.2016.11.025

	Technical, industrial, and clinical challenges.		the developing world. The currently FDA approved drugs for the management of symptomatology of AD are marketed mainly as conventional oral medications. Due to their gastrointestinal side effects and lack of brain targeting, these drugs and dosage regiments hinder patient compliance and lead to treatment discontinu- ation. Nanotechnology-based drug delivery systems (NTDDS) administered by different routes can be considered as promising tools to improve patient compliance and achieve better therapeutic outcomes. Despite extensive re- search, literature screening revealed that clinical activities involving NTDDS application in research for AD are lagging compared to NTDDS for other diseases such as cancers. The industrial perspectives, processability, and cost/benefit ratio of using NTDDS for AD treatment are usually overlooked. Moreover, active and passive immu-		

			nization against AD are by far the mostly studied alternative AD therapies because conventional oral drug therapy is not yielding satisfactorily results. NTDDS of approved drugs appear promising to transform this research from 'paper to clinic' and raise hope for AD sufferers and their caretakers. This review summarizes the recent studies conducted on NTDDS for AD treatment, with a primary focus on the industrial perspectives and processability. Additionally, it highlights the ongoing clinical trials for AD management.		
12	Effect of Sterilization on the Physical Stability of Brimonidine-loaded Solid Lipid Nanoparticles and Nanostructured Lipid Carriers.	Pharmaceutics	Nanoparticulate delivery systems have recently been under consideration for topical ophthalmic drug delivery. Brimonidine base-loaded solid lipid nanoparticles and nanostructured lipid carrier formulations were prepared using glyceryl monostearate as solid lipid and were evaluated for their	2015	http://dx.doi.org/10.1016/j.ijpharm.2015.10.043

			physical stability following sterilization by autoclaving at 121 C for 15 min. The objective of this work was to evaluate the effect of autoclaving on the physical appearance, particle size, polydispersity index, zeta potential, entrapment ef ciency and particle morphology of the prepared formulations, compared to non-autoclaved ones. Results showed that, autoclaving at 121 C for 15 min allowed the production of physically stable formulations in nanometric range, below 500 nm suitable for ophthalmic application. Moreover, the autoclaved samples appeared to be superior to non-autoclaved ones, due to their increased zeta potential values, indicating a better physical stability. As well as, increased amount of brimonidine base entrapped in the tested formulations.		

13	Bioadhesive Ophthalmic Inserts for Treatment of Glaucoma: In Vitro - In Vivo Evaluation.	Pharmaceutics	Bioadhesive ophthalmic inserts were prepared using single polymer, namely: hydroxypropylmethyl cellulose (HPMC), sodium carboxymethyl cellulose (NaCMC), and sodium alginate (SA) in 2% concentration or a mixture of two polymers. The prepared inserts were evaluated in vitro for content uniformity, thickness, folding endurance, weight variation, surface pH, swelling behavior, bioadhesion, in vitro residence time, and drug release. Inserts were evaluated in vivo for intraocular pressure (IOP) lowering effect, in vivo ocular irritancy, and precorneal residence time. In vitro release study exhibited extended release for 8 h. Inserts based on NaCMC were superior over other inserts with respect to swelling, bioadhesion and extended release. Adding HPMC or NaCMC to SA and adding NaCMC to HPMC improved the characteristics of SA and HPMC inserts, respectively. All inserts	2013	

			showed a significant IOP lowering in normotensive rabbits. SA based inserts showed a stable IOP lowering effect for 5 h.		
14	"Lipid-based nanocarriers for ocular drug delivery" in "Nanostructures for Drug Delivery"	Pharmaceutics	Ocular drug delivery remains challenging because of the complex nature and structure of the eye. Conventional systems, such as eye drops and ointments, are inefficient, whereas systemic administration requires high doses resulting in significant toxicity. There is a need to develop novel drug delivery carriers capable of increasing ocular bioavailability and decreasing both local and systemic cytotoxicity. Recently, the emergence of lipid-based nanocarriers has provided a viable means of enhancing the bioavailability of ophthalmic formulations. A number of these formulations have been found to be clinically active. Many nanostructured systems have been employed for ocular drug delivery and yielded some promising results. Solid lipid nanoparticles (SLNs) have been	2017	https://doi.org/10.1016/B978-0-323-46143-6.00016-6

			looked at as a potential drug carrier system since the 1990s. SLNs do not show biotoxicity as they are prepared from physiological lipids and are especially useful in ocular drug delivery as they can enhance the corneal absorption of drugs and improve the ocular bioavailability of both hydrophilic and lipophilic drugs. Also, SLNs allow autoclave sterilization, a necessary step toward formulation of ocular preparations. Recently, nanostructured lipid carriers (NLCs) and lipid drug conjugates (LDCs) have emerged as a new generation of SLNs to overcome problems of low entrapment efficiency and drug expulsion during storage.		