

## The Challenges of Drug Delivery Systems for Topical Treatments of Local Oral Diseases

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The oral mucosa can be affected by numerous local and systemic pathologies [1,2].

To date, most of the topical treatments for local oral disorders are usually based on formulations developed for dermatologic use; consequently, a non-optimal patient compliance may be present because these formulations have a viscid consistency or a bad taste. Moreover, saliva quickly removes the drug from the site of application, reducing its therapeutic efficacy [3-6].

For these reasons, the research of innovative drug delivery systems expressly developed for oral cavity is currently ongoing, with the aim to overcome the above reported obstacles.

To solve the problem due to the saliva presence, various possibilities are currently under observation. In particular, it is possible to use hydrogels, able to adhere to mucosa by hydrogen bonds, increasing the permanency of the drug in the oral cavity [7]. Moreover, the active principle, could be administered entrapped inside nanoparticles (NPs) dispersed in the hydrogels [7]. NPs with muco-adhesive properties have been tested to deliver bactericides directly in the oral cavity [8]; interesting results were obtained using NPs constituted by poly-ethylenimine and dextran sulfate [9], these polymers are able to interact with oral mucosa thanks to ionic bonds formation between the positive NPs and the negative mucosal surface.

This type of drug delivery system are very promising but many other studies are necessary, also to evaluate their cytotoxicity and biocompatibility.

Surely, topical treatment of oral cancers is one of the most important challenges, especially for the side effects of many chemotherapeutics. A critical aspect in the drug delivery is the need to deliver the active compounds directly into cancer cells at therapeutic concentrations. Many systems are currently under evaluation (i.e. liposomes, viral vectors, polymeric nanoparticles, dendrimers, polymersomes etc. [10,11] and, probably, in the future more systems – based as nanoparticles - will be available for local drug delivery [12].

## References

1. Magliocca KR and Fitzpatrick SG. "Autoimmune Disease Manifestations in the Oral Cavity". *Surgical Pathology Clinics* 10.1 (2017): 57-88.
2. Lyer NG., *et al.* "Randomized trial comparing surgery and adjuvant radiotherapy versus concurrent chemoradiotherapy in patients with advanced, nonmetastatic squamous cell carcinoma of the head and neck: 10-year update and subset analysis". *Cancer* 121.10 (2015): 1599-1607.
3. Sankar V., *et al.* "Local drug delivery for oral mucosal diseases: challenges and opportunities". *Oral Diseases* 17. S1 (2011): 73-84.
4. Chau L., *et al.* "Topical agents for oral cancer chemoprevention: A systematic review of the literature". *Oral Oncology* 67 (2017): 153-159.
5. Shipley CA and Spivakovsky S. "Tacrolimus or clobetasol for treatment of oral lichen planus". *Evidence-Based Dental Practice* 17.1 (2016): 16.
6. Paderni C., *et al.* "Oral local drug delivery and new perspectives in oral drug formulation". *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology* 114.3 (2012): e25-e34.
7. Nazar H., *et al.* "Hydrogels in mucosal delivery". *Therapeutic Delivery* 3.4 (2012): 535-555.
8. Chronopoulou L., *et al.* "Chitosan based nanoparticles functionalized with peptidomimetic derivatives for oral drug delivery". *Nature Biotechnology* 33.1 (2016): 23-31.
9. Tiyaaboonchai W., *et al.* "Mucoadhesive polyethylenimine-dextran sulfate nanoparticles containing Punica granatum peel extract as a novel sustained-release antimicrobial". *Pharmaceutical Development and Technology* 20.4 (2015): 426-432.
10. Chou LYT., *et al.* "Strategies for the intracellular delivery of nanoparticles". *Chemical Society Reviews* 40.1 (2011): 233-245.
11. Piao L., *et al.* "Lipid-based nanoparticle delivery of Pre-miR-107 inhibits the tumorigenicity of head and neck squamous cell carcinoma". *Molecular Therapy* 20.6 (2012): 1261-1269.
12. Nguyen S and Hiorth M. "Advanced drug delivery systems for local treatment of the oral cavity". *Therapeutic Delivery* 6.5 (2015): 595-608

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