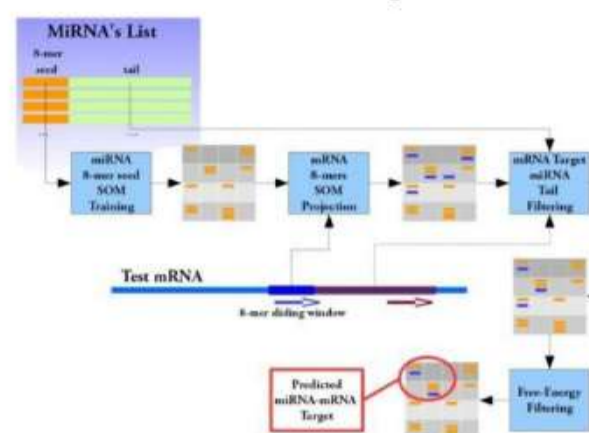


Organizing Map (SOM) based method for the miRNA target prediction. miRNATIP is composed of four steps (see Fig. 1): in the first step, a set of miRNA seeds (8 nt) is used for the training of a SOM. The second step is the projection of a mRNA sequence over the trained SOM. For this reason, we extracted all the 8-length mRNA fragments through a 8-mer sliding window. The result of this step is, for each neural unit (cluster), a list of miRNA_seed-mRNA_fragment. Each cluster can be considered as a preliminary list of predicted miRNAs-mRNAs interaction. Then we computed a dissimilarity measure based on normalised euclidean distance between the remaining part of both miRNA and mRNA sequences, and we retained only the couples whose distance is below a certain threshold. Finally, in the fourth step we performed another filtering to the miRNA-mRNA interaction list, by computing the free-energy of the miRNA-target site duplex. We tested our method by predicting the miRNA target interactions of the *C. elegans* and human species. miRNA mature sequences were downloaded from miRBase, while verified 3'UTR mRNA sequences were extracted from Ensembl. Experimentally validated miRNA-target interaction were taken from mirTarBase and Tarbase. We compared our results with other target predictors: PITA, miRanda, TargetScan, Pictar, Diana-microT. Prediction results, in terms of sensitivity and specificity, demonstrated that outperforms or is comparable to the other six state-of-the-art methods, in terms of validated target and non-target interactions, respectively.



Malattie Metaboliche (MM)

MM1

Production of hyaluronic acid derivative microfibers with controlled dimension as potential drug delivery system

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Microfluidic generation of continuous polymer fibers has many advantages such as easy control of size, simple fabrication process of microscale fibers, and easy loading of biological molecules. Polysaccharides and their derivatives are suitable candidates for modified drug release systems. This work reports the production of microfibers based on a hydrophobic derivative of hyaluronic acid (HA-EDA-C18) loaded with dexamethasone using a microfluidic technique. The introduction of octadecylamine (C18) and ethylenediamine (EDA) portions on hyaluronic acid backbone made the new derivative soluble in water but sensible to ionic strength [1,2]. This particular behavior has been employed to obtain physically crosslinked microfibers immersing the chip in phosphate buffer solution without using chemical crosslinkers. Obtained microfibers have been characterized with optical microscopy and SEM analysis to evaluate their morphology after production in different coagulating media and after one week in phosphate buffer solution, to check their stability. Drug loading and release from microfibers have been also studied, by using dexamethasone as a model drug. This study has showed a simple, cost-effective, well-controlled and biologically compatible process for the production of uniform HA-EDA-C18 microfibers with controlled size and morphology, able to prolong dexamethasone release.



Picture of fabrication process of HA-EDA-C18 microfibers.

[1] F. S. Palumbo et al., (2015) Carbohydr. Polym, 122, 408–416.

[2] F. S. Palumbo et al., (2015) RSC Adv., 5, 61440-61448.