

Nano & bio technologies



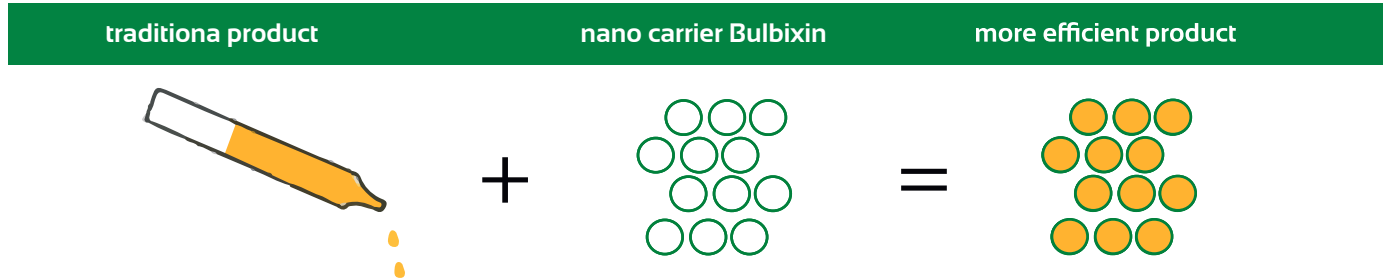
iDelivery
nano&bio technologies

Bulbixin

nano delivery system

The product

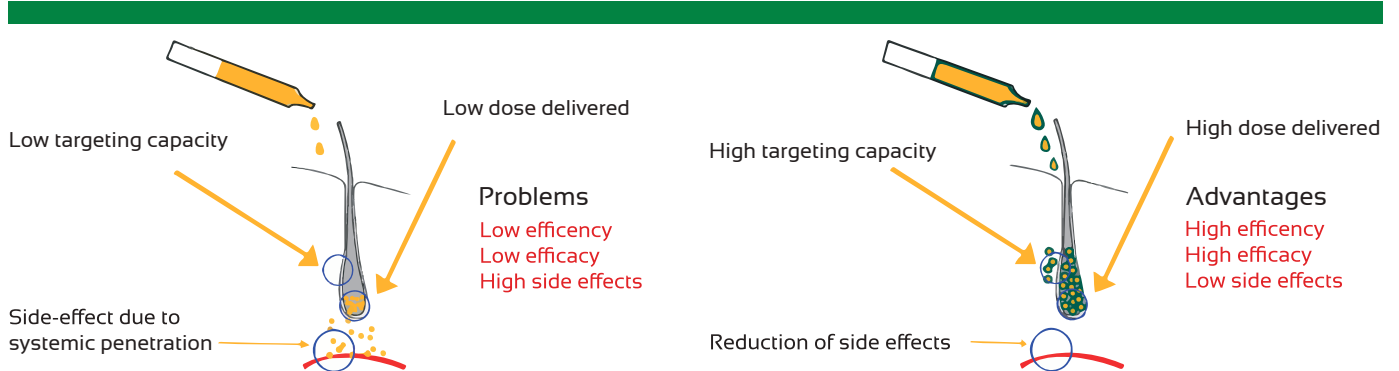
iDelivery i.S.r.l. developed Bulbixin, a versatile nanocarrier able to go through the transfollicular barrier allowing the delivery of actives at full potential, for all the topical treatment related to the pilosebaceous unit (i.e. anti hair-loss, hair removal, anti acneic products).



The problem

Currently actives for cosmetic and pharmaceutical use often suffer of low efficiency in terms of targeting the biological structures.

Traditional product vs Bulbixin



As shown in the figure above traditional products have low ability of targeting the pilosebaceous unit with low level of permeability to the trans level of permeability to the trans follicular barrier

leading to:

- low efficacy
- low care efficiency
- increase probability of adverse effects

Bulbixin nanocarrier confers to traditional products the ability to convey the drug in the targeted biological structure.

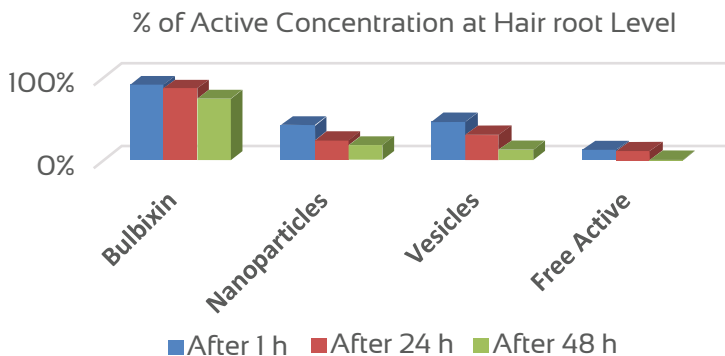
Minoxidil Concentration measurement at follicular level express as % of the initial topical applied dosage, using different nanocarriers and the "free" drug.

Striping Test (Active Minoxil)	Bulbixin	Nanoparticles	Vesicles	Free
After 1h	91%	42%	47%	13%
After 24h	86%	24%	31%	11%
After 48h	74%	18%	13%	1%

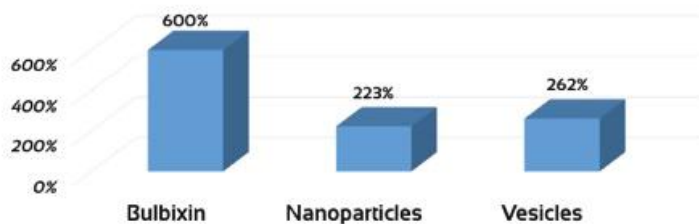
The main target market

The main reference market for Bulbixin is the one related to chemical anti hair loss treatments (5,4 Billions yearly revenue industry, with 5% yearly growth rate). 1,5 billions people suffer of hairloss problems worldwide (65% of men have visible hairloss by the age of 60, 80% of women have visible hairloss by the age of 60). Numerous reports and statistic show how hairloss problems have a serious effect on person lifestyle and level of self-confidence.

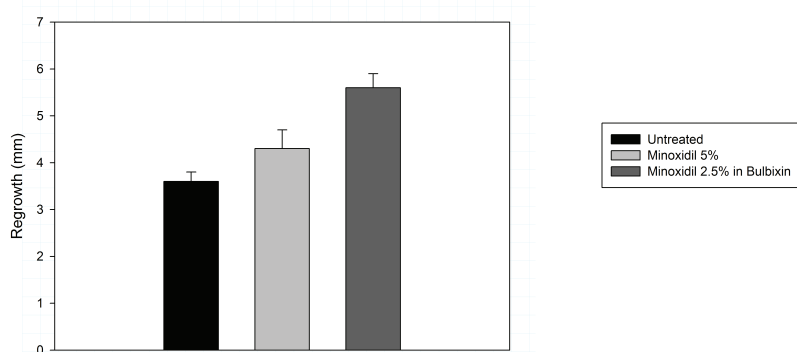
- Consequent decrease of side effects due to the reduction of active compound dispersed at systemic level (safety increased 84%)



% Increase of Active Concentration at Hair root Level (Vs Free drug at 1h)



Hair regrowth after 30 days of treatments



The Benefits

The proposed nanocarrier confers to the final customers the following benefits:

- Increase care efficiency, due to specific targeting (3,35 times from preliminary resting)
- Increase care efficacy, due to the amplification of compound delivery in follicular site (up to two times theoretical increase)
- Consequent decrease of side effects due to the reduction of active compound dispersed at systemic level (safety increased 84%)

The results

Our recent studies confirm the nanocarrier attitude to target the hair bulb, since the first hour of experiment test (figure 1 & table 1)

- Consequent decrease of side effects due to the reduction of active compound dispersed at systemic level (safety increased 84%)

Table 1 Main Experiment performed in order to assess the Bulbixin® nano carrier performances

	TYPE TESTING	EXPERIMENT AIM	RESULTS OBTAINED
A	Vitro bioassay in human cell	Bulbixin® un-loaded Toxicity assessment	Bulbixin® shown high level of tolerability
B	Toxicity in vivo human experiments	Bulbixin® un-loaded Toxicity assessment	Bulbixin® demonstrated high level of tolerability and safety.
C	Ex vivo (Franz Cells) experiments	Benchmarking with state of the art nanocarrier in terms of: -Percutaneous permeation -Dose Release -Physical- Chemical stability	Bulbixin® shown: -Good permeation capabilities - Optimal Releasing capabilities - High level of Physical- Chemical stability
D	In vivo experiments on mice benchmarking against three state of the art Nano carriers	Benchmarking Bulbixin® against the state of the art Nano carriers in terms of specific targeting capabilities for the hair hair root	Bulbixin® shows superior targeting capacity for the pilosebaceous unit.
E	In vivo experiments on mice	Benchmarking Bulbixin® capabilities with anti-hair loss / drugs (Minoxidil)	Better targeting capacity to pilosebaceous unit besides showing a long life time in situ and high dosage delivered.
F	Differential Stripping: Determination of the Amount Penetrated into the Hair Follicles	To determine the amount of topically applied substances penetrated into the hair follicles.	Bulbixin® showed a selective targeting for the pilosebaceous unit.
G	In vivo measurement of the stratification in the different skin layers of the drug	Evaluation of the disposition of the drug in the skin layers, when topically applied.	Bulbixin® disposes in the dermis, where pilosebaceous units are present.
H	Production process and encapsulation studies	Assessment of the cost related to Bulbixin® production process and raw materials.	The technology introduction cost are minimal for Bulbixin®: - Simple technological production process - Availability and low cost of raw materials

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