

UNIVERSITAT DE BARCELONA

FACULTAT DE FARMÀCIA

DEPARTAMENT DE FARMÀCIA I TECNOLOGIA FARMACÈUTICA
Unitat de Farmàcia i Tecnologia Farmacèutica

TARGETING OF ANTILEISHMANIAL DRUGS PRODUCED BY
NANOTECHNOLOGIES

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**TARGETING OF ANTILEISHMANIAL DRUGS PRODUCED BY
NANOTECHNOLOGIES**

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OBJECTIVES.....	1
BIBLIOGRAPHIC SECTION.....	3
1. LEISHMANIOSIS	5
1.1. Brief history of the disease	5
1.2. Causative agent and transmission.....	6
1.3. Disease.....	7
1.4. Distribution and epidemiology	10
1.5. Prevention and control.....	11
1.6. Treatment.....	12
1.7. <i>In vitro</i> studies of efficiency of antileishmanial drugs	13
2. ANTIMONIALS	15
2.1. Brief history.....	15
2.2. Meglumine antimoniate.....	16
2.2.1. Physical and chemical characteristics.....	17
2.2.2. Mode of action.....	18
2.2.3. Pharmacokinetics.....	20
2.2.4. Toxicity.....	21
2.3. Antimony resistance in <i>Leishmania</i>	23
2.3.1. P-glycoprotein	24
3. CONTROLLED DRUG DELIVERY SYSTEMS	25
3.1. Introduction	25
3.2. Macrophage antileishmanial drugs delivery systems	25
3.3. Macrophage uptake of nano-microspheres.....	27
3.4. Macrophage uptake studies using quantum dots	29
3.4.1. Brief history and definition of quantum dots.....	29
3.4.2. Quantum dots features	29
3.4.3. Quantum dots conjugates	31
3.5. Oral particulate delivery	31
4. MICROENCAPSULATION OF DRUGS	33
4.1. Introduction	33
4.2. Applications.....	34
4.3. Routes and modes of administration	35
4.4. Methods of microencapsulation	36
4.5. Materials used in microencapsulation	41
4.6. <i>In vitro</i> release testing of microsphere drug delivery systems	42
4.6.1. Introduction	42
4.6.2. <i>In vitro</i> release methods for microparticulates	42
4.6.3. Drug release mechanism from microparticulates	45
EXPERIMENTAL SECTION	49
5. DEVELOPMENT OF MEGLUMINE ANTIMONIATE FORMULATION.....	51
5.1. INTRODUCTION	51
5.2. MATERIALS	52
5.2.1. Chitosan	52
5.2.1.1. Physicochemical properties	52
5.2.1.1. Biological properties.....	53
5.2.1.2. Chitosan as pharmaceutical excipient.....	54
5.2.2. Chemicals	55
5.2.3. Parasite strains and cultures.....	57
5.2.4. Equipments	58

5.2.4.1. Equipments for development.....	58
5.2.4.2. Equipments for pharmaceutical products characterization.....	59
5.2.4.3. Equipments for biological assays	59
5.2.5. Specific software	60
5.3. METHODS.....	60
5.3.1. Obtention of meglumine antimoniate by lyophilization.....	60
5.3.2. Characterization of meglumine antimoniate.....	61
5.3.2.1. Antimony purity	61
5.3.2.2. IR Assay	63
5.3.2.3. X-rays diffraction assay.....	63
5.3.2.4. Particle size distribution	65
5.3.2.5. Scanning Differential Calorimetry	66
5.3.2.6. Solubility	66
5.3.2.7. pH in aqueous solution	66
5.3.3. Development of a new dosage form for meglumine antimoniate	67
5.3.3.1 Emulsions, self-emulsifying drug delivery systems and nanosuspensions	67
5.3.3.2. Nano/microspheres by spray-drying.....	71
5.3.3.2.1. Spray-dried nano/microspheres characterization.....	76
A) Morphological analysis by Scanning Electron Microscope.....	76
B) Particles size distribution	77
C) Moisture content by Karl Fischer titration	77
D) Efficiency of encapsulation	78
E) Z-potential.....	79
F) Determination of yield of spray-drying process	79
G) In vitro drug release studies.....	79
5.3.3.2.2. Chitosan nano/microspheres preparing a novel O/W emulsion technique by spray-drying	82
A) Pre-formulation	82
B) Influence of lipid concentration, inlet temperature and emulsification method	84
C) Influence PGPA inhibitors	85
5.3.3.2.3. Optimization of chitosan microspheres preparing solutions by spray-drying.....	85
A) Pre-formulation	85
B) Fractional experimental design 2^{5-1}	86
5.3.4. Investigation of microsphere surface characteristics on macrophage uptake using quantum dots (QD) assisted imaging.....	88
5.3.4.1. Synthesis and water solubilization of CdSe/ZnS QDs.	88
5.3.4.2. Encapsulation of CdSe/ZnS QDs in micelles.	88
5.3.4.3. Characterization of QDs solution	89
5.3.4.3.1. Concentration	89
5.3.4.3.2. Fluorescence	90
5.3.4.4. Encapsulation of QDs in microspheres	90
5.3.4.4.1. Encapsulation of QDs in chitosan microspheres by spray-drying	90
5.3.4.4.2. Encapsulation of QDs in PLGA microspheres by solvent evaporation technique (double emulsion).....	93
5.3.4.4.3. Characterization of microspheres	94
A) Particle size distribution.....	94
B) Z-potential.....	94

C) SEM	94
D) Confocal microscopy	94
5.3.4.3. Uptake studies	96
5.3.4.3.1. Cell cultures	96
5.3.4.3.2. Confocal microscopy	96
5.3.5. <i>In vitro</i> parasitological assays	97
5.3.5.1. <i>L.infantum</i> promastigotes culture	97
5.3.5.2. <i>L.infantum</i> amastigotes culture	97
5.3.5.2.1. Obtain peritoneal macrophage cells	97
5.3.5.2.2. Obtain <i>L.infantum</i> amastigotes	97
5.3.5.3. Preparation of samples for testing	98
5.3.5.4. Assay on promastigotes	98
5.3.5.4.1. Counting of <i>Leishmania infantum</i> promastigotes	98
5.3.5.4.2. Preparation of reagents	99
5.3.5.4.3. Phosphatases assay	99
5.3.5.5. Assay on intracellular amastigotes (IA)	100
5.3.5.6. Assay of cytotoxicity	100
5.3.5.7. Statistical analysis	100
5.4. RESULTS AND DISCUSSION	101
5.4.1. Obtention of meglumine antimoniate by lyophilization	101
5.4.2. Characterization of meglumine antimoniate	102
5.4.2.1. Antimony purity	102
5.4.2.2. IR Assay	102
5.4.2.3. X-rays diffraction assay	103
5.4.2.4. Particle size distribution	104
5.4.2.5. Scanning Differential Calorimetry	104
5.4.2.6. Solubility	106
5.4.2.7. pH in aqueous solution	106
5.4.3. Development of a new dosage form for meglumine antimoniate	106
5.4.3.1. Emulsions, self-emulsifying drug delivery systems and nanosuspensions	106
5.4.3.2. Nano/microspheres by spray-drying	108
5.4.3.2.1. Chitosan microspheres preparing a novel O/W emulsion technique by spray-drying	108
A) Pre-formulation	108
B) Influence of lipid concentration, inlet temperature and emulsification method	112
B.1. Influence of parameters on morphological properties	112
B.2. Influence of parameters on residual moisture	114
B.3. Influence of parameters on the yield of the process	114
B.4. Influence of parameters on efficiency of encapsulation	116
C) Influence of PGPA inhibitors	118
5.4.3.2.3. Optimization chitosan microspheres preparing solutions by spray- drying	120
A) Pre-formulation	120
B) Fractional experimental design	122
B.1. Influence of parameters on outlet temperature	124
B.2. Influence of parameters on moisture	125
B.3. Influence of parameters on yield	127
B.4. Influence of parameters on efficiency of encapsulation	128
B.5. Influence of parameters on particle size distribution	131

B.6. Influence of parameters on Z-potential.....	135
B.7. Influence of parameters on morphology	137
B.8. Dissolution studies	139
5.4.4. Investigation of microsphere surface characteristics on macrophage uptake using quantum dots (QD) assisted imaging.....	150
5.4.4.1. Characterization of QD solution.....	150
5.4.4.1.1. Concentration	150
5.4.4.1.2. Fluorescence	151
5.4.4.2. Encapsulation of QD in microspheres	151
5.4.4.2.1. Characterization of microspheres	151
A) Particle size and Z-potential.....	151
B) SEM.....	152
C) Confocal microscopy	153
5.4.4.2.2. Uptake studies	155
A) MHS cells	155
B) RAW 264.7 cells	158
5.4.5. In vitro parasitological studies.....	159
5.4.5.1. Study of the excipients	159
5.4.5.2. Study of meglumine antimoniate microspheres	160
5.4.5.2.1. In vitro studies of chitosan microspheres prepared from O/W emulsions by spray-drying	161
5.4.5.2.2. In vitro studies of chitosan microspheres prepared from solutions by spray-drying.....	164
A) Influence of technological factors on effectiveness of meglumine antimoniate microspheres against <i>L.infantum</i>	164
B) Relation between effectiveness against <i>L.infantum</i> and dissolution studies of chitosan microspheres	170
B.1. IC50 vs. drug released in 24h	170
B.2. IC50 vs. drug release mechanism	171
B.3. IC50 vs. drug release kinetics	172
5.5. CONCLUSIONS	175
BIBLIOGRAPHY	177
ANNEX	197
“VEHICULITZACIÓ DE FÀRMACS A CÈL·LULES DIANA PEL TRACTAMENT DE LA LEISHMANIOSIS MITJANÇANT NANOTECNOLOGIES”.....	199

OBJECTIVES

Leishmaniosis is a worldwide health problem that affects more than 12 million people. For the last 60 years, the pentavalent antimonials available, sodium stibogluconate and the meglumine antimoniate (MGA), have been considered first-line drugs for treatment for controlling leishmaniosis. Normally, they are administered by intramuscular route, inducing local pain. Furthermore, because of their quick elimination, a multidose program is required. Antimonials have several other disadvantages; toxic effects such as arthralgia, nausea, abdominal pain, chemical pancreatitis and cardiotoxicity. Treatment failures with those drugs are becoming a common problem in endemic areas with the emergence of drug resistance. Neither the traditional second-line drugs such as pentamidine and amphotericin B, which are more toxic and difficult to administer, nor the recent oral agent miltefosine, provide a clear alternative for the treatment of visceral leishmaniosis. For this reason, it to be of interest to continue searching for new options for treatment.

The aim of this work is to develop an effective new MGA delivery system by means of nanotechnology for the treatment of leishmaniosis which could be administered by parenteral or oral route in a future. Moreover, for ensuring the effectiveness of the formulations developed, their *in vitro* activities will be assessed against *L. infantum*. The intention is to prepare a target drug delivery system by means of different technological strategies like micro-nanoparticles by spray drying. These formulations should target the antileishmanial drug to the macrophages which are the host cells of *Leishmania* parasites. If this purpose was achieved the drug bioavailability would be increased, therefore lower doses could be administered, reducing the side effects and improving the efficiency of the treatment.

The main objective can be summarized as to develop and characterize a new MGA formulation using nanotechnologies. It implies:

1. To study *in vitro* the effectiveness and cytotoxicity of formulations against *Leishmania*.
2. To develop preliminary *in vitro* uptake studies in macrophages using quantum dots assisted imaging.
3. To study MGA release profile from the new delivery device developed.

