Spray dried cubosomes with ovalbumin and Quil-A as a nanoparticulate dry powder vaccine formulation - DTU Orbit (31/03/2019)

Spray dried cubosomes with ovalbumin and Quil-A as a nanoparticulate dry powder vaccine formulation

Subunit vaccine formulations are often produced as liquid dispersions through complicated processes. It is desirable, however, to have simple, cheap and up-scalable methods to produce nanoparticulate subunit vaccines in powder form. Here, a simple single-step spray drying process for production of powder cubosome precursors with the model antigen ovalbumin (OVA) and the adjuvant Quil-A is presented. The cubosomes were characterized in vitro and evaluated in vivo by subcutaneous and oral administration for their potential as a vaccine formulation. Hydrated cubosomes had average particle size of 257±8nm and zeta potential of −18.0±0.6mV. The powder contained 10.6±0.7% w/w OVA prior to hydration, of which 65±1% was released within the first 20min in 9.5mM PBS at pH 7.3, with the remaining OVA gradually released over the following 24h. Immunization with cubosomes resulted in significantly stronger antigen-specific serum IgG responses (p<0.01), CD8+ T cell expansion (p<0.0001) and target T cell killing compared to controls when given s.c., and was ineffective orally. This study shows that spray drying is a suitable method for producing nanoparticulate vaccine formulations in dry powder form.

General information
State: Published
Organisations: Department of Micro- and Nanotechnology, Nanoprobes, University of Otago, University of Copenhagen, Monash University
Number of pages: 10
Pages: 35-44
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: International Journal of Pharmaceutics
Volume: 550
Issue number: 1-2
ISSN (Print): 0378-5173
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 4.06 SJR 1.172 SNIP 1.27
Web of Science (2017): Impact factor 3.862
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.24 SJR 1.323 SNIP 1.386
Web of Science (2016): Impact factor 3.649
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 4.2 SJR 1.298 SNIP 1.45
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 4.13 SJR 1.347 SNIP 1.551
Web of Science (2014): Impact factor 3.65
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 4.17 SJR 1.377 SNIP 1.605
Web of Science (2013): Impact factor 3.785
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 4.1 SJR 1.552 SNIP 1.637