Supplementary material

Table S1 List of publications used in data extraction

1. Kang F, Singh J. Effect of additives on the release of a model protein from PLGA microspheres. *AAPS PharmSciTech.* 2001;2(4):30.
2. Zhou XL, He JT, Du HJ, et al. Pharmacokinetic and pharmacodynamic profiles of recombinant human erythropoietin-loaded poly(lactic-co-glycolic acid) microspheres in rats. *Acta Pharmacol Sin*. 2012;33(1):137–44.
3. Fan D, De Rosa E, Murphy MB, et al. Mesoporous silicon-PLGA composite microspheres for the double controlled release of biomolecules for orthopedic tissue engineering. *Adv Funct Mater*. 2012;22(2):282–293.
4. Kim TH, Lee H, Park TG. Pegylated recombinant human epidermal growth factor (rhEGF) for sustained release from biodegradable PLGA microspheres. *Biomaterials*. 2002;23(11):2311–2317.
5. Blanco D, Alonso MJ. Protein encapsulation and release from poly(lactide-co-glycolide) microspheres: effect of the protein and polymer properties and of the co-encapsulation of surfactants. *Eur J Pharm Biopharm*. 1998;45(3):285–294.
6. Mok H, Park TG. Water-free microencapsulation of proteins within PLGA microparticles by spray drying using PEG-assisted protein solubilization technique in organic solvent. *Eur J Pharm Biopharm*. 2008;70(1):137–144.
7. Buske J, König C, Bassarab S, Lamprecht A, Mühlau S, Wagner KG. Influence of PEG in PEG-PLGA microspheres on particle properties and protein release. *Eur J Pharm Biopharm*. 2012;81(1):57–63.
8. Corrigan OI, Li X. Quantifying drug release from PLGA nanoparticulates. *Eur J Pharm Sci*. 2009;37(3–4):477–485.
9. Puras G, Salvador A, Igartua M, Hernández RM, Pedraz JL. Encapsulation of Aβ(1–15) in PLGA microparticles enhances serum antibody response in mice immunized by subcutaneous and intranasal routes. *Eur J Pharm Sci*. 2011;44(3):200–206.
10. Kim HK, Park TG. Microencapsulation of dissociable human growth hormone aggregates within poly(D,L-lactic-co-glycolic acid) microparticles for sustained release. *Int J Pharm*. 2001;229(1–2):107–116.
11. Han Y, Tian H, He P, Chen X, Jing X. Insulin nanoparticle preparation and encapsulation into poly(lactic-co-glycolic acid) microspheres by using an anhydrous system. *Int J Pharm*. 2009;378(1–2):159–166.
12. He J, Feng M, Zhou X, et al. Stabilization and encapsulation of recombinant human erythropoietin into PLGA microspheres using human serum albumin as a stabilizer. *Int J Pharm*. 2011;416(1):69–76.
13. Gasper MM, Blanco D, Cruz ME, Alonso MJ. Formulation of L-asparaginase-loaded poly(lactide-co-glycolide) nanoparticles: influence of polymer properties on enzyme loading, activity and in vitro release. *J Control Release*. 1998;52(1–2):53–62.
14. Kawashima Y, Yamamoto H, Takeuchi H, Fujioka S, Hino T. Pulmonary delivery of insulin with nebulized DL-lactide/glycolide copolymer (PLGA) nanospheres to prolong hypoglycemic effect. *J Control Release*. 1999;62(1–2):279–287.
15. Ungaro F, d'Emmanuele di Villa Bianca R, Giovino C, et al. Insulin-loaded PLGA/cyclodextrin large porous particles with improved aerosolization properties: in vivo deposition and hypoglycaemic activity after delivery to rat lungs. *J Control Release*. 2009;135(1):25–34.
16. Jiang HL, Jin JF, Hu YQ, Zhu KJ. Improvement of protein loading and modulation of protein release from poly(lactide-co-glycolide) microspheres by complexation of proteins with polyanions. *J Microencapsul*. 2004;21(6):615–624.
17. Pirooznia N, Hasannia S, Lotfi AS, Ghanei M. Encapsulation of alpha-1 antitrypsin in PLGA nanoparticles: in vitro characterization as an effective aerosol formulation in pulmonary diseases. *J Nanobiotechnology*. 2012;10:20.
18. Castellanos IJ, Flores G, Griebenow K. Effect of cyclodextrins on alpha-chymotrypsin stability and loading in PLGA microspheres upon S/O/W encapsulation. *J Pharm Sci*. 2006;95(4):849–858.

Table S2 Full data base used in the study

The full data base of macromolecules release from PLGA microparticles
http://nigella.farmacja.cm-uj.krakow.pl/~kuba/Int_J_Nanomedicine/Supplementary_material_S2.xlsx

Table S3 The results of the formulation-to-formulation relRMSE (%)

Formulation no	relRMSE (%)	
	MON-MLP model	GP model (Equation 2)
1	9.56	14.43
2	10.29	11.70
3	22.14	18.00
4	2.56	11.74
5	22.63	14.75
6	12.01	19.47
7	10.72	13.99
8	10.12	13.87
9	11.42	12.84
10	20.92	21.92
11	17.73	5.25
12	7.48	8.78
13	17.47	8.94
14	12.79	23.37
15	3.12	5.35
16	1.75	9.75
17	16.10	6.76
18	13.47	8.76
19	1.83	5.27
20	4.31	8.38
21	12.97	15.05
22	3.87	7.57
23	6.26	12.34
24	6.55	6.99
25	5.35	12.21
26	25.05	13.12
27	14.48	8.83
28	17.05	14.67
29	11.20	9.26
30	15.05	7.01
31	36.03	27.25
32	34.23	26.38
33	8.21	10.49
34	26.99	25.33
35	6.85	5.46
36	26.82	22.38
37	28.55	22.87
38	19.27	24.45
39	8.78	11.05
40	9.20	9.04
41	18.09	17.55
42	16.36	15.15
43	10.71	5.39
44	7.15	10.71
45	20.51	7.39
46	8.75	32.83
47	15.23	23.02
48	21.05	20.61
49	4.70	17.83
50	11.18	6.56
51	10.90	16.59
52	11.20	18.85
53	10.85	19.87
54	7.63	10.20
55	25.31	10.20
57	19.16	24.17
58	24.05	21.14
59	31.39	29.31
60	28.53	22.90
61	30.81	5.76
62	18.73	6.79
63	7.59	8.59
64	13.37	6.16
65	8.93	7.73
66	4.61	10.34
67	11.72	4.76
68	14.25	5.85
Min	1.75	4.76
Max	36.03	32.83
Mean	14.39	13.75