Clinical Translation of Long-Acting Drug Delivery Systems for Posterior Capsule Opacification Prophylaxis

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Table S1. Query search of published literatures for ocular drug delivery system for anterior segment diseases in Web of Science Core Collection

Searching Step	Searching Topic [a]
1	nanomedicine
2	nanoparticle
3	nanodevice
4	drug delivery system
5	intraocular lens
6	IOL
7	combine 1 OR 2 OR 3 OR 4 OR 5 OR 6
8	publication date range "2008-2022"
9	document types as "article" and "review article"
10	anterior segment disease
11	cataract-related disorder
12	cataract
13	corneal disease
14	combine 10 OR 11 OR 12 OR 13

15	publication date range "2008-2022"
16	document types as "article" and "review article"
17	combine 9 AND 16

ᵃ Topic term within a record include title, abstract, author keywords, keywords Plus®

Table S2. Query search of published literatures for posterior capsule opacification (PCO) in Web of Science Core Collection.

Searching Step	Searching Topic ᵃ
1	posterior capsular opacification
2	posterior capsule opacification
3	PCO
4	combine 1 OR 2 OR 3
5	publication date range "2008-2022"
6	document types as "article" and "review article"

ᵃ Topic term within a record include title, abstract, author keywords, keywords Plus®

Table S3. Query search of published literatures for drug delivery system for PCO in Web of Science Core Collection

Searching Step	Searching Topic ᵃ
1	posterior capsular opacification
2	posterior capsule opacification
3	PCO
4	combine 1 OR 2 OR 3
5	publication date range "2008-2022"
6	document types as "article" and "review article"
7	nanomedicine
8	nanoparticle
9	nanodevice

10	drug delivery system
11	intraocular lens
12	IOL
13	combine 7 OR 8 OR 9 OR 10 OR 11 OR 12
14	publication date range "2008-2022"
15	document types as "article" and "review article"
16	combine 6 AND 15

[a] Topic term within a record include title, abstract, author keywords, keywords Plus®

The drug release profile of DDS in each reference (**Table S4**) was selected if it was applied *in vivo*. Firstly, individual data points corresponding to the drug release cumulative time (t) in *x-axis* and the fraction (%) of drug released in time t (F) in *y-axis* were acquired by Getdata software. To assess the goodness of fit of a model for fitting drug release profiles, statistical criteria including the correlation coefficient (R^2), the coefficient of determination ($R^2_{adjusted}$), the mean square error (MSE), the Akaike Information Criterion (AIC) and the Model Selection Criterion (MSC) were determined by the program DDSolver [1]. Mathematical models used to fit the drug release profiles include the zero-order with T_{lag}, Logistic 1, Logistic 2 and Gompertz 1. The equations were as follows:

$$\text{Zero-order with } T_{lag}: \ F = k_0 \cdot \left(t - T_{lag} \right);$$

$$\text{Logistic 1}: \ F = 100 \cdot \frac{e^{\alpha + \beta \cdot \log t}}{1 + e^{\alpha + \beta \cdot \log t}};$$

$$\text{Logistic 2}: \ F = F_{max} \cdot \frac{e^{\alpha + \beta \cdot \log t}}{1 + e^{\alpha + \beta \cdot \log t}};$$

$$\text{Gompertz 1}: \ F = 100 \cdot e^{-\alpha \cdot e^{-\beta \cdot \log t}}$$

Where T_{lag} was the lag time prior to drug release, k_0 was the zero-order release constant, α was the scale factor in Logistic 1 and 2, Gompertz 1 and 2 models, β was the shape factor in Logistic 1 and 2, Gompertz 1 and 2 models, F_{max} was the maximum fraction of the drug released at infinite time.

After selecting the optimal drug dissolution model, the time (T_{50} and T_{90}) when F reached 50% and 90% were calculated, respectively. The unit was uniformly converted to days. The selected drug dissolution models and statistical criteria are shown in **Table S4**.

Table S4. The goodness of fit of the model for drug release profiles of anti-PCO DDS

References [a]	Drug Dissolution Models	Statistical Criteria
[2]	Logistic 1	R^2 0.9432; $R^2_{adjusted}$ 0.9337; MSE: 1.4910; AIC: 21.5295; MSC: 2.3683
[3]	/	/
[4]	Logistic 1	R^2 0.9884; $R^2_{adjusted}$ 0.9873; MSE: 1.9926; AIC: 39.9040; MSC: 4.1269
[5]	Logistic 1	R^2: 0.9822; $R^2_{adjusted}$: 0.9804; MSE: 17.9234; AIC: 66.2643; MSC: 3.6946
[6]	Gompertz 1	R^2: 0.9584; $R^2_{adjusted}$: 0.9584; MSE: 0.2248; AIC: 15.7712; MSC: 2.8722
[7]	Logistic 1	R^2: 0.9905; $R^2_{adjusted}$: 0.9893; MSE: 12.5206; AIC: 50.0682; MSC: 4.2536
[8]	Logistic 2	R^2: 0.9903; $R^2_{adjusted}$: 0.9871; MSE: 11.6764; AIC: 44.2439; MSC: 3.9695
[9]	Zero-order with T_{lag}	R^2: 0.9677; $R^2_{adjusted}$: 0.9657; MSE: 5.9742; AIC: 86.0807; MSC: 3.2119
[10]	Logistic 1	R^2: 0.9458; $R^2_{adjusted}$: 0.9439; MSE: 74.8207; AIC: 233.4190; MSC: 2.7824
[11]	Gompertz 1	R^2: 0.9837; $R^2_{adjusted}$: 0.9822; MSE: 0.0980; AIC: 4.9776; MSC: 3.8068
[12]	Gompertz 1	R^2: 0.9459; $R^2_{adjusted}$: 0.9351; MSE: 18.2460; AIC: 35.5937; MSC: 2.3461
[13]	/	/
[14]	/	/
[15]	Zero-order with T_{lag}	R^2: 0.9639; $R^2_{adjusted}$: 0.9518; MSE: 8.0458; AIC: 19.9188; MSC: 2.5201

[16]	Logistic 2	Moxifloxacin: R^2: 0.9969; $R^2_{adjusted}$: 0.9962; MSE: 4.9608; AIC: 46.4910; MSC: 5.2411
	Logistic 1	Dexamethasone: R^2: 0.9904; $R^2_{adjusted}$: 0.9897; MSE: 10.9108; AIC: 78.3205; MSC: 4.3835
	Logistic 1	Genistein: R^2: 0.9986; $R^2_{adjusted}$: 0.9968; MSE: 1.0821; AIC: 43.6580; MSC: 5.5412
[17]	Logistic 2	R^2: 0.9425; $R^2_{adjusted}$: 0.9137; MSE: 54.2423; AIC: 43.6583; MSC: 1.9988

[a] Reference [3]: the drug release profile was pperiodically triggered by the NIR and exhibited the stair shape. The model was not available in DDSolver; references[13] and [14]: the drug release F cannot be obtained due to insufficient information of drug loading content.

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