

## Kinetik Modelling

### Skema

[Transkripsi gen LhGR -> translasi gen LhGR di sitoplasma]

↓

[Paparan dexamethasone]

↓

[Dexamethasone berikatan dengan LhGR di nucleus -> aktivasi LhGR]

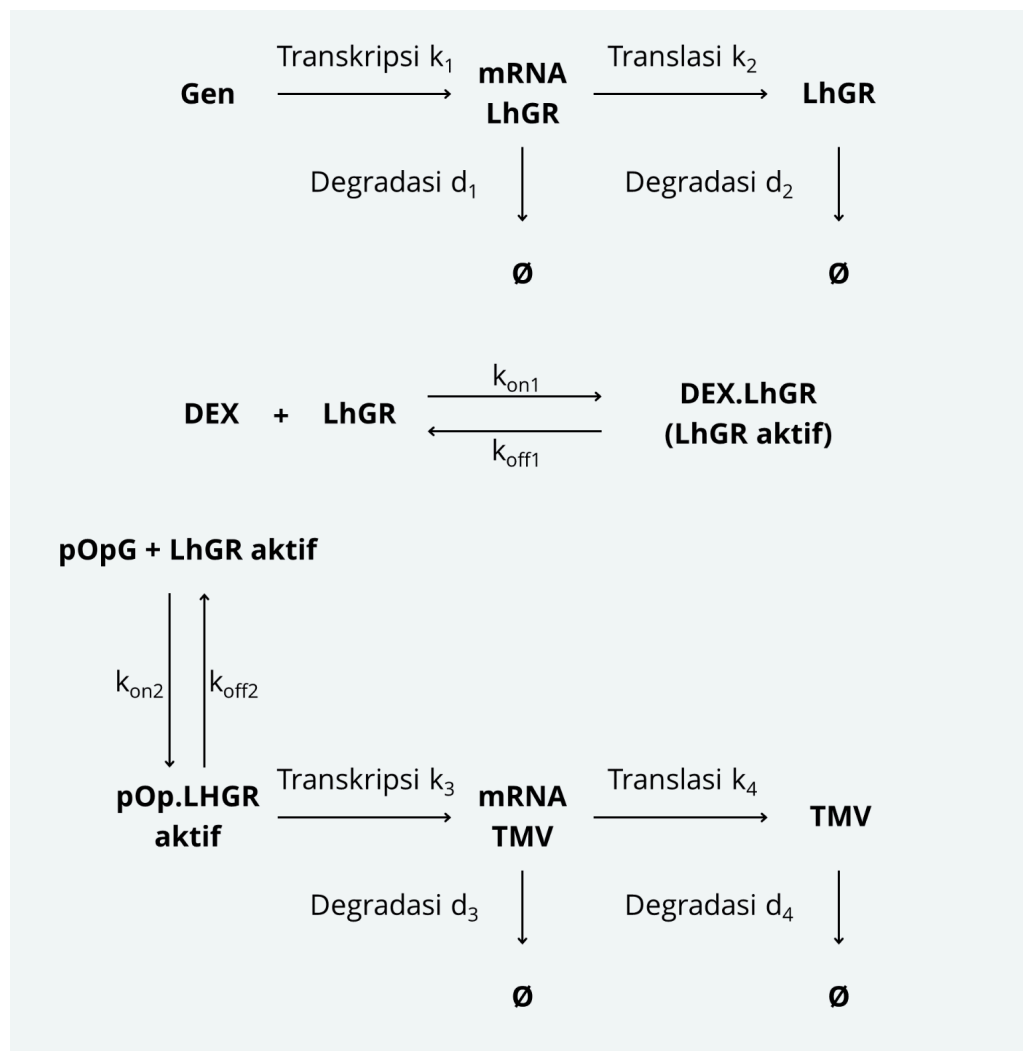
↓

[LhGR aktif berikatan dengan promotor pOp6 pada gen replicase TMV]

↓

[Transkripsi gen replicase TMV -> Translasi di sitoplasma]

### Reaksi



## Ordinary Differential Equation

$$\frac{d[mRNA_{LhGR}]}{dt} = k_1[gene] - d_1[mRNA_{LhGR}]$$

$$\frac{d[LhGR]}{dt} = k_2[mRNA_{LhGR}] - d_2[LhGR] - k_{on}[DEX][LhGR] + k_{off}[LhGR_{active}]$$

$$\frac{d[DEX]}{dt} = -k_{on}[DEX][LhGR] + k_{off}[LhGR_{active}]$$

$$\frac{d[LhGR_{active}]}{dt} = k_{on}[DEX][LhGR] - k_{off}[LhGR_{active}]$$

$$\frac{d[TMV]}{dt} = \alpha \frac{[LhGR_{active}]^n}{K_d + [LhGR_{active}]^n} - d_4[TMV]$$

## Parameter

No	Symbol	Value	Unit	Reference	Information
1	$k_1$	0.013	$s^{-1}$	(Bionumbers, 2015)	General transcription rate
2	$d_1$	0.0005775	$s^{-1}$	(Bionumbers, 2024c)	General degradation rate
3	$k_2$	0.01	$s^{-1}$	(Ross & Orlowski, 1982)	General translation rate
4	$d_2$	0.0005775	$s^{-1}$	(Bionumbers, 2024c)	General degradation rate
5	$k_{on}$	$5.1 \times 10^3$	$M^{-1}s^{-1}$	(Pratt, Kaine & Pratt, 1975)	Associate rate constant
6	$k_{off}$	$2 \times 10^{-6}$	$s^{-1}$	(Pratt, Kaine & Pratt, 1975)	Dissociation rate constant
7	$\alpha$	0.015	$s^{-1}$	(Maiuri et al., 2011)	General maximal transcription rate
8	$k_d$	$5.2 \times 10^{-9}$	M	(Bionumbers, 2024b)	Equilibrium dissociation constant
9	n	2	-	-	Hill coefficient
10	$d_4$	0.00027	$s^{-1}$	(Bionumbers, 2024a)	General degradation rate

## **Referensi**

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