

Supplementary Table 1. Plasmids used.

	Relevant characteristics	Reference or source
Plasmid		
pGFP	Vector for GFP gene expression	[NOVAGEN]
pCGLS1	Vector containing the <i>lux</i> operon from <i>Xenorhabdus luminescens</i> for bacterial bioluminescence and <i>in-vivo</i> imaging (GenBank accession no. M90092)	[7]
pET28a ⁺ :: <i>chrR</i>	<i>E. coli</i> ChrR (GenBank accession no. DQ989184)	[7]
pET28a ⁺ :: <i>chrR6</i>	<i>E. coli</i> mutant (ChrR6) enzyme of ChrR (GenBank accession no. DQ987901)	[7]
pKT2/UXbGSN	Transposon vector with neomycin/G418-resistance marker for stable gene expression in mammalian cells driven by the human ubiquitin C promoter	[16; Bachman, M and Contag, C; unpublished]
pKT2/CXSZ	Transposon vector with zeocin resistance gene for stable gene expression in mammalian cells driven by the CMV-IE promoter	[16; Bachman, M and Contag, C; unpublished]
pUbc-SB11	Vector for transient expression of a modified <i>Sleeping Beauty</i> transposase	[16]

Supplementary Table 2. Kinetics of CNOB reduction of the wild type ChrR and the improved ChrR6 enzymes.

Enzyme	V_{\max} (nmol CNOB mg protein⁻¹ min⁻¹)	K_m (μM)	K_{cat} (S⁻¹)	K_{cat}/K_m (M⁻¹S⁻¹)
ChrR	14 \pm 5	0.203 \pm 0.03	0.477 \pm 0.15	2.3X10 ⁶ \pm 6 X10 ⁵
ChrR6	263 \pm 3	0.136 \pm 0.02	8.8 \pm 0.7	6.4X10 ⁷ \pm 5 X10 ⁵

Supplementary Table 3. CNOB administration was done intravenously to healthy female Balb/C mice age 8-10 weeks. Blood samples were collected by retino orbital bleeding 7 days following CNOB injection.

Test	3.3 mg/kg CNOB	H/L	9.9 mg/kg CNOB	H/L	20 mg/kg CNOB	H/L	Reference range	Units
Glucose	245.5 ± 6.7		238 ± 1.4	L	284.5 ± 44.5		255 – 320	mg/dL
AST	120.5 ± 13.1		117.5 ± 3.6	L	106.5 ± 10.6	L	130 – 200	IU/L
ALT	66 ± 1.4		72 ± 12.7		97 ± 29.7		45 – 100	IU/L
Alkaline phosphatase	148 ± 0.7		155 ± 2.8		144 ± 11.3		150 – 160	IU/L
GGT	10.5 ± 2.5	H	7 ± 1.4	H	10 ± 0	H	1-2	IU/L
Total Bilirubin	0		0		0.1 ± 0.1		0-0.4	mg/dL
Cholesterol	102.5 ± 0.4		107 ± 0.1		113.5 ± 2.1		95-135	mg/dL
BUN	30	H	33.5 ± 3.5	H	28.5 ± 3.5		17-24	mg/dL
Creatinine*							0.15 – 0.45	mg/dL
Calcium	7.85 ± 2.1		11.8 ± 0.3		12.2 ± 0.1	H	8.9 – 10.7	mg/dL
Phosphorus	5.65 ± 0.1	L	7.05 ± 1.3		6.3 ± 1.0	L	8-11	mg/dL
Calcium/Phosphorus ratio	1.4 ± 0.4		1.75 ± 0.4		2 ± 0.4	H	0.9-1.7	
T. protein	5.4 ± 0.1		5.4 ± 0.5		5.4 ± 0.2		5.0 – 6.2	mg/dL
Albumin	1.8 ± 0.1		1.8 ± 0.4		2.4 ± 0.2	H	1.3-1.7	mg/dL
Globulin	3.6 ± 0.2		3.6 ± 0.9		3.0 ± 0.0	L	3.7-4.2	
A/G ratio	0.55 ± 0.3		0.6 ± 0.2		0.8 ± 0.1	H	0.3-0.5	
CPK	908.5 ± 360.3	H	728 ± 314	H	433 ± 100.4	H	50 - 300	IU/L

* Creatine = less than 0.6 mg/dL

Abbreviations: AST, aspartate aminotransferase; ALT, alanine aminotransferase; GGT, γ -glutaminyl aminotransferase; BUN, blood urea nitrogen; A/G ratio, albumin/globulin ratio; CPK, creatine phosphokinase.