

Assignment 2

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Week 2: Glucocorticoid receptor dynamica

Opdracht 1

```
parameters <- c(Ks_RM = 2.90,
                IC50_Rm = 26.2,
                Kon = 0.00329,
                Kt = 0.63,
                Kre = 0.57,
                Rf = 0.49,
                Kd_r = 0.0572,
                Kd_rm = 0.612,
                Ks_r = 3.22,
                D = 20)

state <- c(Rm0 = 4.74,
           R0 = 267,
           DR = 0,
           DRn = 0)

times <- seq(0, 48, by = 1)

volume <- function(t,y,parms){
  with(as.list(c(y, parms)),{
    dmRNA <- Ks_RM * (1 - (DRn / (IC50_Rm + DRn))) - Kd_rm * Rm0
    dR <- Ks_r * dmRNA + Rf * Kre * DRn - Kon * D * R0 - Kd_r * R0
    dDR <- Kon * D * R0 - Kt * DR
    dDRn <- Kt * DR - Kre * DRn
    return(list(c(dmRNA, dR, dDR, dDRn)))
  }
)

out <- ode(times = times, y = state, parms = parameters, func = volume)

plot(out, ylab=c("receptor mRNA", "free receptor density",
                "drug-receptor complex", "activated receptor complex"),
```

```
main="")
mtext("Lorenz model")
```

