



# WD1 Wet-lab Data

Type	Label
Description	“Mutually exclusive activation of the notch-FGF and Wnt clusters during one segmentation clock oscillation. Expression profiles of cyclic genes of (A) notch, (B) FGF, and (C) Wnt pathways along the microarray time series.”
Reference	Figure 3
Type of experiment	in vitro
Organism	Mouse (embryo)
Tissue	presomitic mesoderm (PSM)
Study	Dequeant et al. 2006

# RQ1 Research question

Type	Label
Description	“Can the coupling of the Notch, Wnt and FGF oscillators result in their synchronization?”
Study	Goldbeter et Pourquié 2008

# RQ2 Research question

Type	Label
Description	“Does synchronization require that the autonomous periods of the three oscillating pathways, i.e. their period in the absence of coupling, be sufficiently close to each other?”
Study	Goldbeter et Pourquié 2008

# RQ3 Research question

Type	Label
Description	“Can quasiperiodic, complex periodic or aperiodic (i.e., chaotic) oscillations result from the coupling of the three oscillating pathways when their autonomous periods are too far apart from each other?”
Study	Goldbeter et Pourquié 2008

# RQ4 Research question

Type	Label
Description	“Is mutual inhibition required to explain the antiphase oscillations in the Wnt and in the FGF/Notch pathways, or can this phase relationship be obtained in other conditions?”
Study	Goldbeter et Pourquié 2008

# QM1 Qualitative model

Type	Label
Description	“Our approach at this stage is qualitative rather than quantitative, as we wish to explore the dynamical consequences of negative feedback regulation within each pathway and of the coupling between the Wnt, Notch and FGF pathways without trying to use experimentally established parameter values, many of which have yet to be determined”
Reference	Figure 2
Species	Notch, Lunatic Fringe, Lunatic fringe mRNA, Axin2, Axin2 mRNA, $\beta$ -catenin, Gsk3, Ras, ERK, transcription factor X, MKP3/Dusp6, MKP3/Dusp6 mRNA
Compartments	Cytosol, nucleus
Study	Goldbeter et Pourquié 2008

# A1 Assumption

Type	Label
Description	“we do not consider Wnt explicitly but assume that a constant level of Wnt corresponds to a constant level of Dsh, which is treated as a parameter”
Category	Equivalence (392)
Study	Goldbeter et Pourquié 2008



# A2 Assumption

Type	Label
Description	“we do not consider Wnt explicitly but assume that a constant level of Wnt corresponds to a constant level of Dsh, which is treated as a parameter”
Category	Omitted process (397)
Study	Goldbeter et Pourquié 2008

# A3 Assumption

Type	Label
Description	“coupling the Wnt and FGF pathways, we assume that the expression of the gene Axin2 in the Wnt pathway is induced not only by $\beta$ -catenin but also by the transcription factor X activated in the FGF pathway”
Category	Transcription (183)
Study	Goldbeter et Pourquié 2008

# BSM1 Building simulation model

Type	Label
Description	Development of three independent models for three signaling pathways
Study	Goldbeter et Pourquié 2008

# SM1 Simulation model

Type	Label
Description	“temporal evolution of the Notch module” → Eqs. (A.1)–(A.5)
Reference	Not available
Study	Goldbeter et Pourquié 2008

# SM2 Simulation model

Type	Label
Description	“temporal evolution of the Wnt module” → Eqs. (A.6)-(A.11)
Reference	Not available
Study	Goldbeter et Pourquié 2008

# SM3 Simulation model

Type	Label
Description	“temporal evolution of the FGF module” → Eqs. (A.12)–(A.16)
Reference	Not available
Study	Goldbeter et Pourquié 2008

# ASM1 Analyzing simulation model

Type	Label
Description	Analysis of Wnt sub module
Study	Goldbeter et Pourquié 2008

# SE1 Experiment

Type	Label
Description	“For an appropriate set of parameter values, numerical integration of the kinetic equations Eqs. (A.6)–(A.11) shows that sustained oscillations in all six variables can occur in a given range of (constant) Wnt levels. The Axin2 and Gsk3 proteins oscillate out of phase.”
Reference	Not available
Category	Time course analysis
Study	Goldbeter et Pourquié 2008



# SD1 Data

Type	Label
Description	Simulation results of SE1
Reference	Figure 3
Related to	SE1
Study	Goldbeter et Pourquié 2008

# BSM2 Building simulation model

Type	Label
Description	Coupling of three models
Study	Goldbeter et Pourquoié 2008

# SM4 Simulation model

Type	Label
Description	“coupled system formed by the Wnt, Notch and FGF modules” → Eqs. (A.1)–(A.16) subjected to the changes specified by Eqs. (A.17) and (A.18)”
Reference	<a href="https://www.ebi.ac.uk/biomodels/BIOMD0000000201">https://www.ebi.ac.uk/biomodels/BIOMD0000000201</a>
Study	Goldbeter et Pourquié 2008

# ASM2 Analyzing simulation model

Type	Label
Description	Analysis of system of coupled models
Study	Goldbeter et Pourquié 2008

# SE2 Experiment

Type	Label
Description	“sustained oscillations are again obtained, but in contrast to the case of independent oscillations when the three signaling pathways are uncoupled and oscillate each at their own pace”
Reference	Not available
Category	Time course analysis
Study	Goldbeter et Pourquié 2008

# SD2 Data

Type	Label
Description	Simulation results of SE2
Reference	Figure 4
Related to	SE2
Study	Goldbeter et Pourquié 2008

# SE3 Experiment

Type	Label
Description	“kinetic equations for the FGF, Wnt and Notch signaling modules were multiplied by scaling parameters $\eta$ , $\varepsilon$ , and $\theta$ so that the relative periods of the three oscillators could easily be changed”
Reference	Not available
Category	Parameter scan
Study	Goldbeter et Pourquié 2008

# SD3 Data

Type	Label
Description	Simulation results of SE3
Object reference	“When oscillations in the Wnt, Notch and FGF signaling pathways synchronize, their phase relationships closely depend on the nature of the cross-talk between the three pathways. Also influencing the phase relationships are the relative values of the autonomous period of each of the three oscillating pathways prior to coupling”
Related to	SE3
Study	Goldbeter et Pourquié 2008