

Checklist of model standards

CHECKLIST FOR MODEL AGAINST DESIRED STANDARDS: CHECK X FOR THOSE MET			
Check YES (either manual or auto if standard met)	YES		
model author = checked by author; checked within model code by math?	model author	checked in code?	Problem? Limit? Other?.
Group 1: Identification and Description			
1. Model Name, Key words (generic and specific)			
2. Brief one or two line description			
3. Detailed description, diagrams, equations			
4. Reference to Publication describing the model			
5. Pointer to the publication or pdf			
6. Related Models, antecedents, comparables, and successors			
Group 2. Model Structure and Content			
1. Domain definition (cells, mito, tissues, organ system, organism)			
2. Main variables (chemicals, pressures, etc.), with units			
3. Parameters, with units, and with source references			
4. Descriptions and references for subsidiary models			
5. Source Code: Clear, deeply commented, explained, referenced.			
6. Inputs and outputs defined. All nodes and edges defined.			
7. Define linkage type (Chemical, electrical, mechanical,etc.)			
8. Ontology base for notation			
9. Numerical solvers used, and conditions set			
Group 3. Verification: math of model and solution methods are sound			
1. Unitary Balance: (units on all variables and parameters)			
2. Mass balance: (list constituents whose conservation is checked)			
3. Charge balance: (ion currents, membrane potential)			
4. Osmotic balance: (volume, total activities, fluxes)			
5. Thermodynamic Balance (Haldane constraints on reactions)			
6. All equations correct, units balance, with all terms defined			
7. Numerical solutions checked against analytical solutions			
8. Running code supplied in a common format			
9. Solutions show little dependence on time or space step size			
10. Methods for verification defined. Reference model solution?			
Group 4. Validation: model is physiologically realistic			
1. Initial and boundary conditions in accord with physiology			
2. Data provided, and fitted by model			
3. Model is predictive, shown to fit other data not used as basis			
4. Parameters justified (sources provided) and evaluated			
Group 5: Availability of Source Code and Forum for critiques			
1. Website source from which to download model code and data			
2. Website or email or address to accept queries			
3. Website for public commentary and responses			
4. References to subsequent publications or alternative models			
Revised 12sep09 by JBBassingthwaighte			