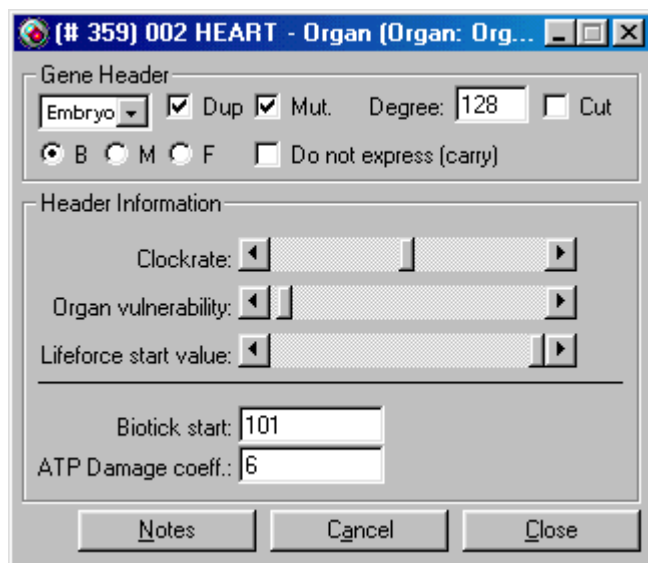


Organs: A summary of how they work

Organs are a new feature of Creatures2. Just like real-life organs, they contain biochemical functions, and can be damaged by disease, and repair themselves. In a generation one Norn there are 20 organs, although one of these is female-only. The more organs a Norn has, the more ATP it will use up.

Just like the other genes, the organ genes can be mutable, allowing Creatures to accumulate new organs for new functions. The gene appears like this:



The “Clockrate” determines how frequently the contained biochemistry will be updated. The further to the right the slider bar is, the more frequently the biochemistry will be updated. It is possible for a receptor to speed this up, or slow it down.

The “Organ vulnerability” sets how fast the Long Term Life Force moves towards the Short Term Lifeforce. The lower it is the more resistant the organ will be to damage (see below for a more complete description of this system).

The “Lifeforce start value” determines how sturdy the organ is at birth, and how much damage it can take before it dies.

The “Biotick start” is a way to co-ordinate the genesis of organs during development, so their functions switch on in the right order.

The “ATP damage coefficient” defines how dependent on ATP the organ is. ATP is the energy source for chemical reactions, receptors and emitters, and when it runs out the Creature becomes unconscious, and the organs start to degrade, being injured at a speed determined by their damage coefficient.

Organs allow biochemistry genes to be regulated in groups based on their common function. An organ will “contain” and regulate all the biochemistry genes following it in the genome, up until the next organ gene. The organ clockrate has a locus which receptors can attach to, and so it can be regulated according to a chemical level for instance. This allows reactions to be sped up or slowed down to maintain a constant chemical concentration, and deal with fluctuating conditions.

NOTE: if an organ’s clockrate ever falls to zero, the biochemistry that it contains will never be updated again, so the organ will be effectively dead. It is therefore important when setting up organs that their clockrate can never fall to zero.

Organs can be in a healthy or damaged state, determined by their Short Term and Long Term Life Force values. Organs can take damage from diseases or physical injury, lowering their Short Term Life Force, and producing Injury chemical as a signal to the immune system. When Short Term and Long Term Life Forces are apart, they move towards each other at a certain rate. The rate at which Short Term Life Force moves is generally faster than Long Term Life Force, and is open to regulation through a locus. This allows for organs to heal, at a rate which can be influenced by the biochemistry.

If an organ's Long Term Life Force falls to zero the organ is declared dead, and the biochemistry it contains will never be updated again. In this way Creatures can lose some functions before others. For instance, it is possible for a Norn to catch a disease which kills their reproductive system, rendering the Norn infertile, but otherwise healthy. Once an organ has died there is no way to bring it back to life.

To increase the rate of healing, each organ has a locus called the 'Repair rate', which a receptor can attach to. The effect of this locus is to regulate the rate at which Short Term Life Force returns towards Long Term Life Force. In hatchery Norns this locus is regulated by prostaglandin, which is produced by the bones in response to Injury chemical.