

Box 1. Definitions of some terms used in this review

Robustness

The insensitivity of a phenotype or fitness to perturbation. According to the source of perturbation, the robustness of a particular phenotype can be defined separately to developmental noise, environmental fluctuations, or to genetic change (mutational robustness).

Plasticity/responsiveness

The changeability of a phenotype against perturbations. For example, the responsiveness of gene expression can be quantified as the total variance of gene expression across conditions [21].

Isogenic phenotypic fluctuation/noise

The variation of a phenotype or trait among organisms with identical genotype (clones) sharing the same environment.

Genetic variance

The variance of a phenotype resulting from differences in genotype in a population. It can be sub-classified into different categories according to the source of genetic variation (such as mutation or recombination).

Mutational variance

The increase in the variance of a trait introduced by mutations each generation.

Canalization

The suppression of variation in a phenotype through development or evolutionary processes. Introduced by Waddington [2] to discuss biological robustness, it describes the ability of a population to produce the same phenotype regardless of stochastic, environmental or genetic variation.

Genetic Assimilation

The process of fixation by genetic change of a phenotype/trait that first appeared under some environment perturbation; an environment induced phenotype becomes stably inherited.