A simplified method to assess the synchronization properties of the body clock

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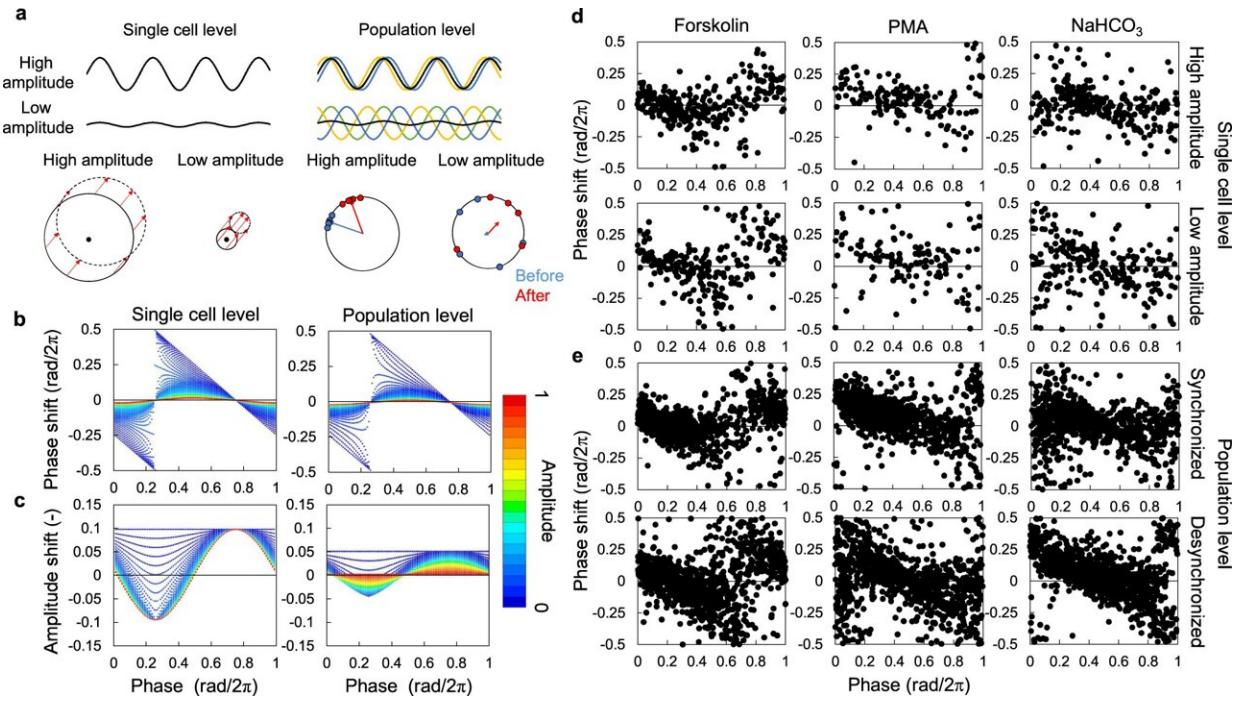

Amplitude dependency of PRCs at the cellular and population levels. **a** Models of circadian rhythm and phase response at the cellular and population levels. **b** Mathematical models for PRC at the single cell and population levels. **c** Mathematical models for amplitude response curve at the single cell and population levels. PRCs for forskolin, PMA, and $NaHCO_3$ at the single cell (**d**) and population levels (**e**). At the population level, one sample contains five cells, which are randomly selected. Concentrations of forskolin, PMA, and $NaHCO_3$ were 0.75 μM, 2 μM, and 77.75 mM for single-cell PRCs and 0.5 μM, 1 μM and 66.5 mM for population PRCs, respectively. In single-cellular PRCs, an amplitude of $A > 0.6$ was defined as high amplitude, while A 0.8 was defined as synchronized, while R