

## Supplementary information

### Figure legends

Fig. S1. Schematic illustration of image processing in colony image analysis.

Fig. S2. Schematic illustration of image processing in colony image analysis for marker staining rate measurement.

Fig. S3. Homogeneity of cell seeding within 6-well plate. The bee swarm plot of colony size and number is illustrated as time course data to show the homogeneity of seeding technique in the sample preparation in this study. From these data, we consider that the data of adherent cell number from the image reflects the effect of vibration rather than the seeding bias.

Fig. S4. Correlation plot between the colony area and nuclei stained area. This correlation indicates that the total colony area value can represent the cellular number. Based on this result, we further used the total colony area to represent cell growth data.

Fig. S5. Preliminary examination of practical vibrations in cell culture. Acceleration and frequency were measured by acceleration sensor (Nihon Kohden Corp. Tokyo, Japan).

Fig. S6. The correlation between the colony size and their marker staining ratio. Colonies were categorized and plotted within 10-bins. When colonies exceeded a certain size, staining is consistent. However, with small sizes, the staining rates are largely varied.

Table S1 Types of mechanical vibrations in cell culture

<b>Category of vibrations</b>	<b>Effective parameter</b>	<b>Vibration types</b>	
Periodic	Frequency-dominant	Motor-related vibrations	
One-shot (can be periodic by mechanization / automation)	Impact-dominant	Transfer-related vibrations Error impact-related vibrations	Non-intentional
Uncontrolled mixture of periodic / one-shot	Impact and frequency (Uncontrolled)	Tapping, agitation, mixing, etc.	Intentional (Presently operated manually)

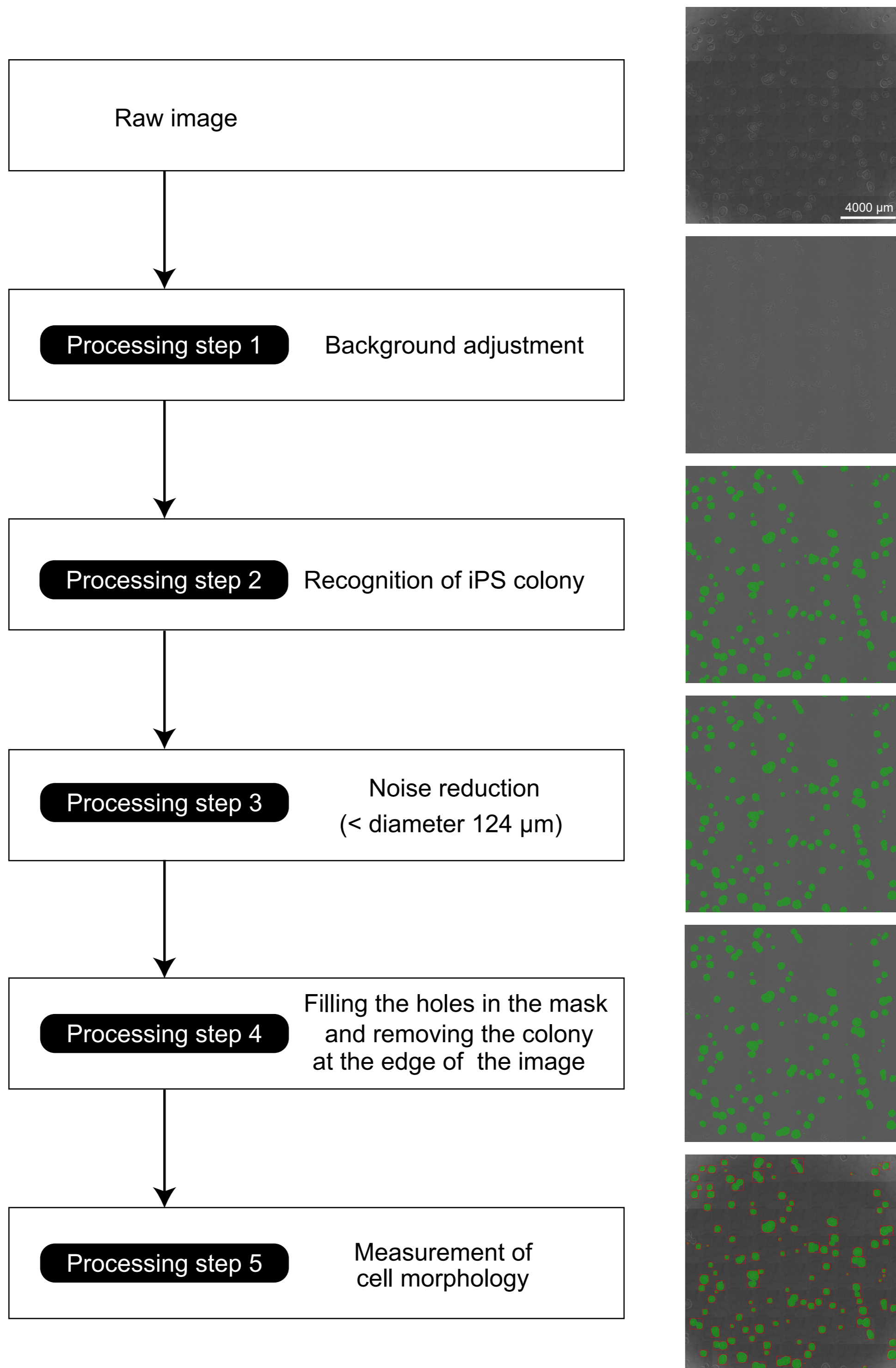


Fig. S1

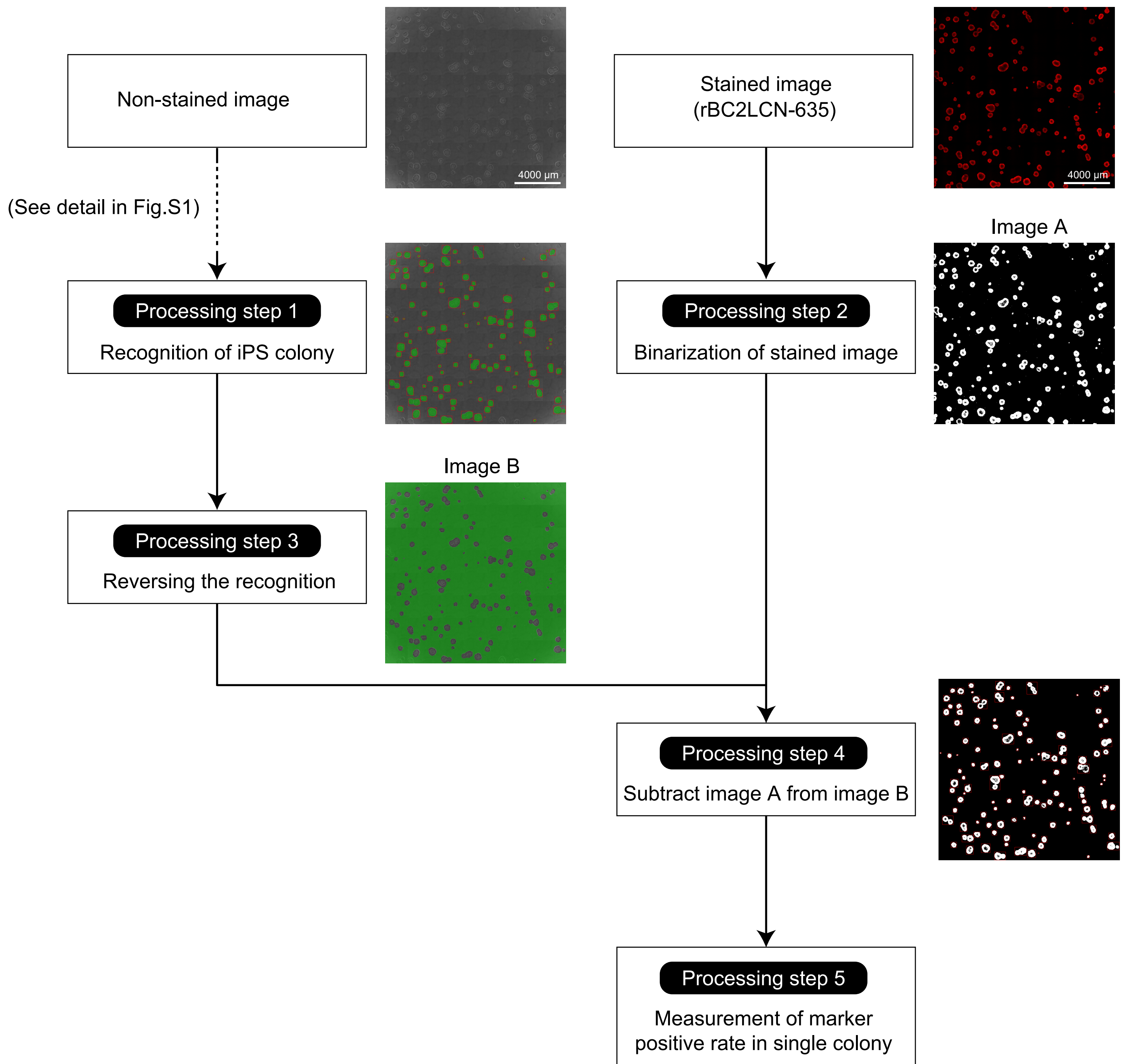


Fig. S2

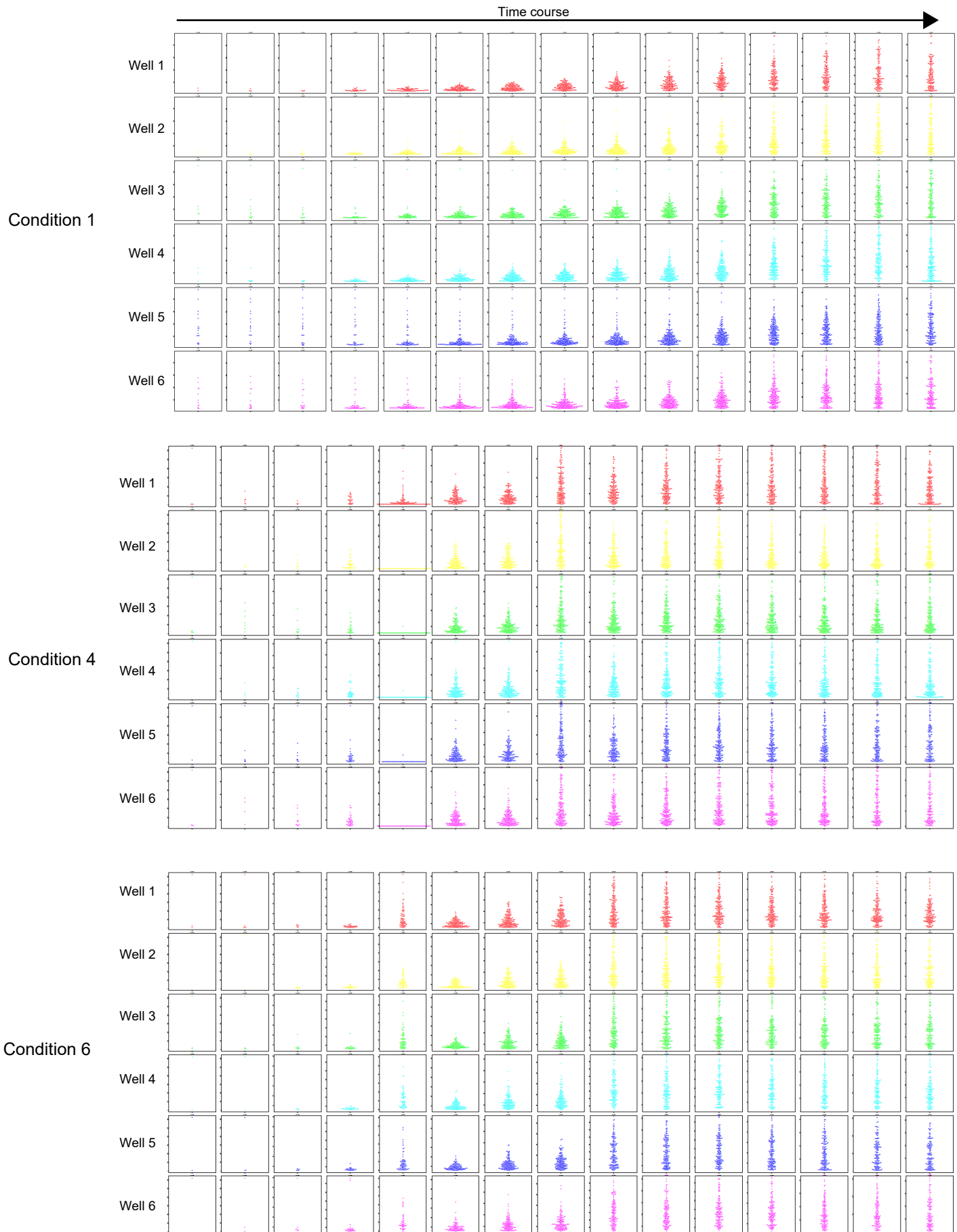


Fig. S3

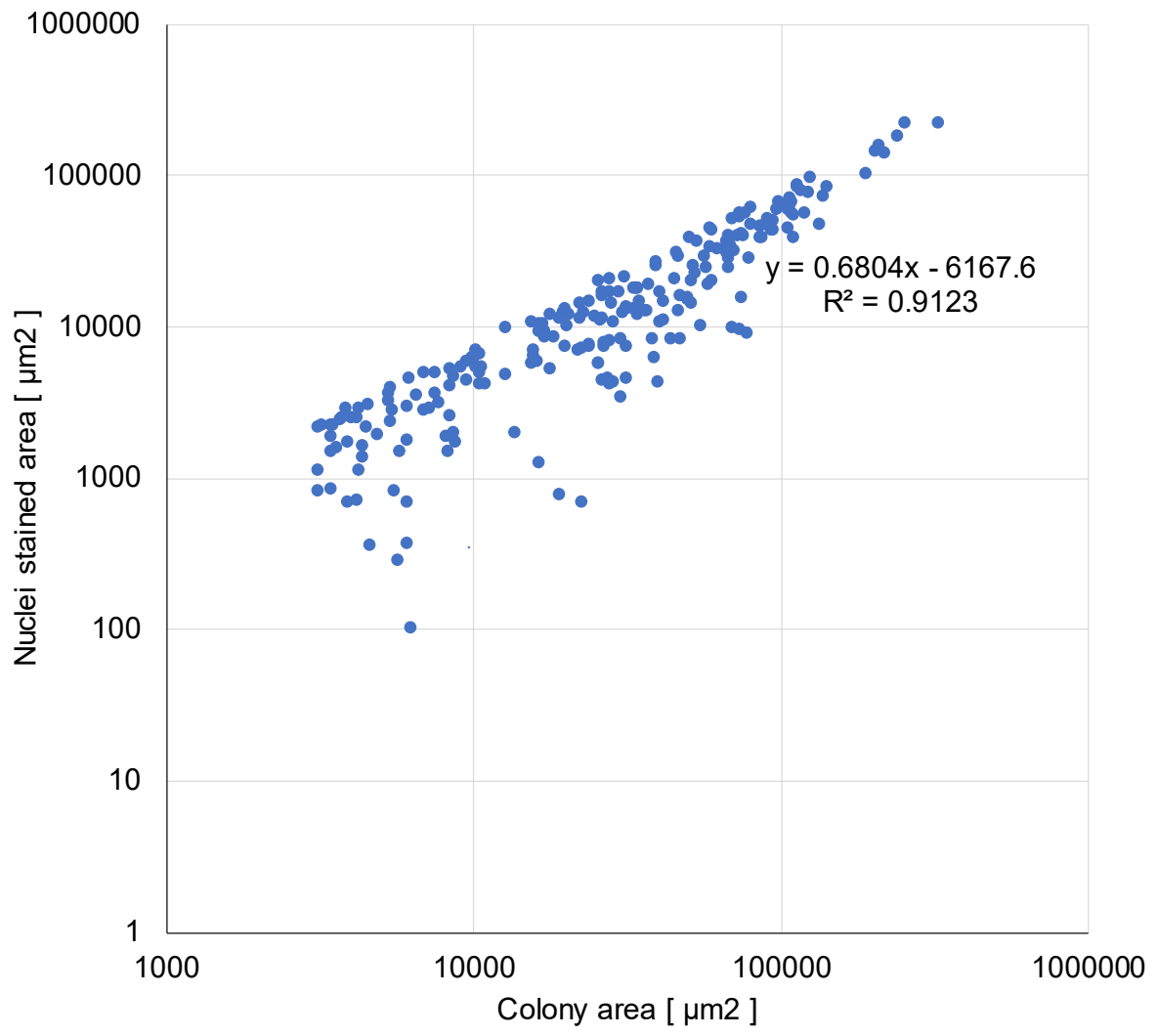


Fig. S4

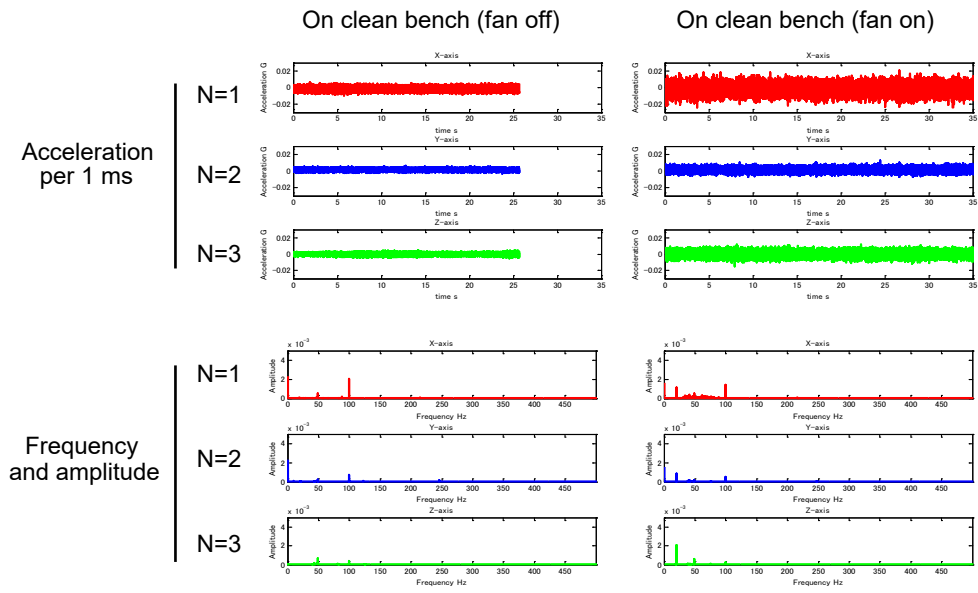
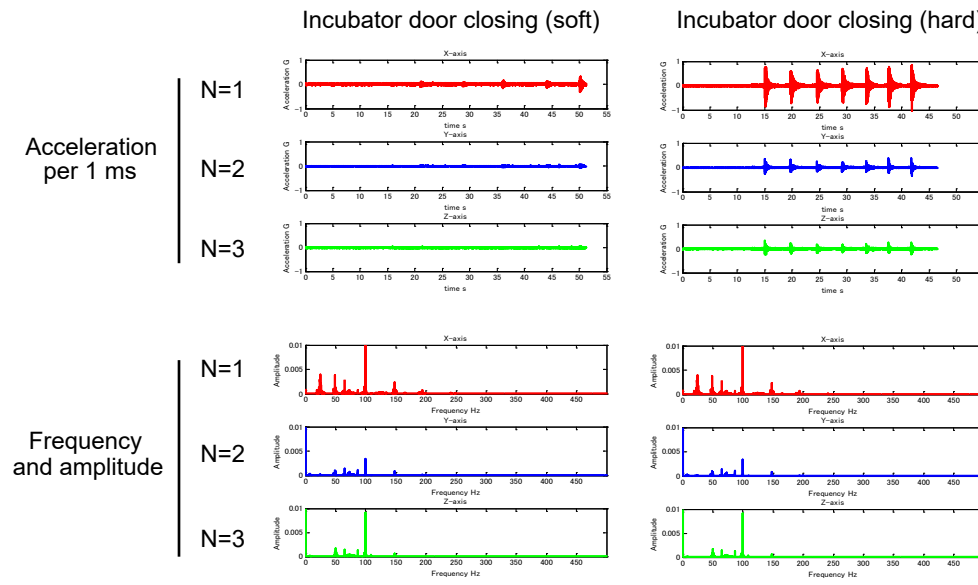
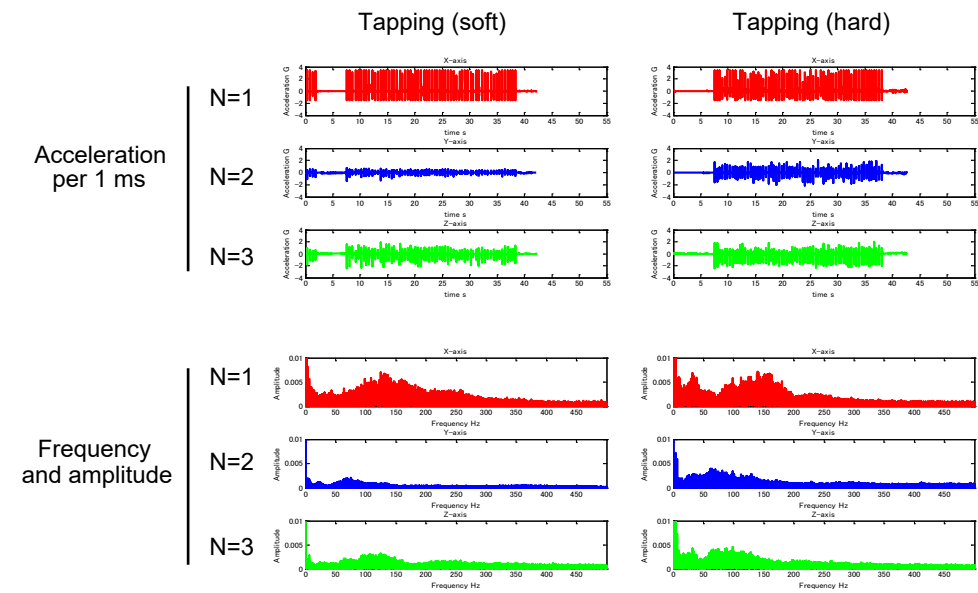
**A****B****C**

Fig. S5

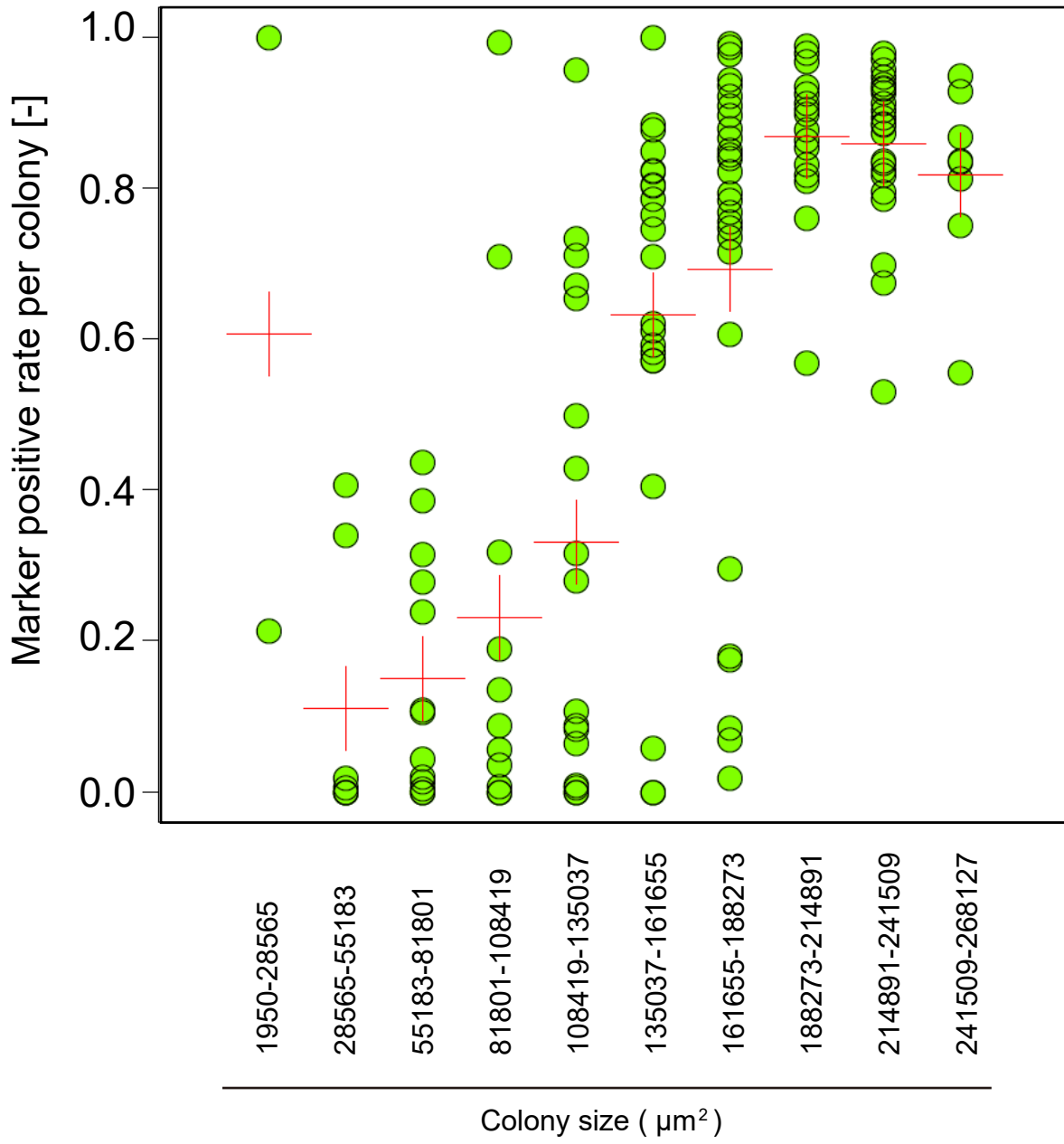


Fig. S6