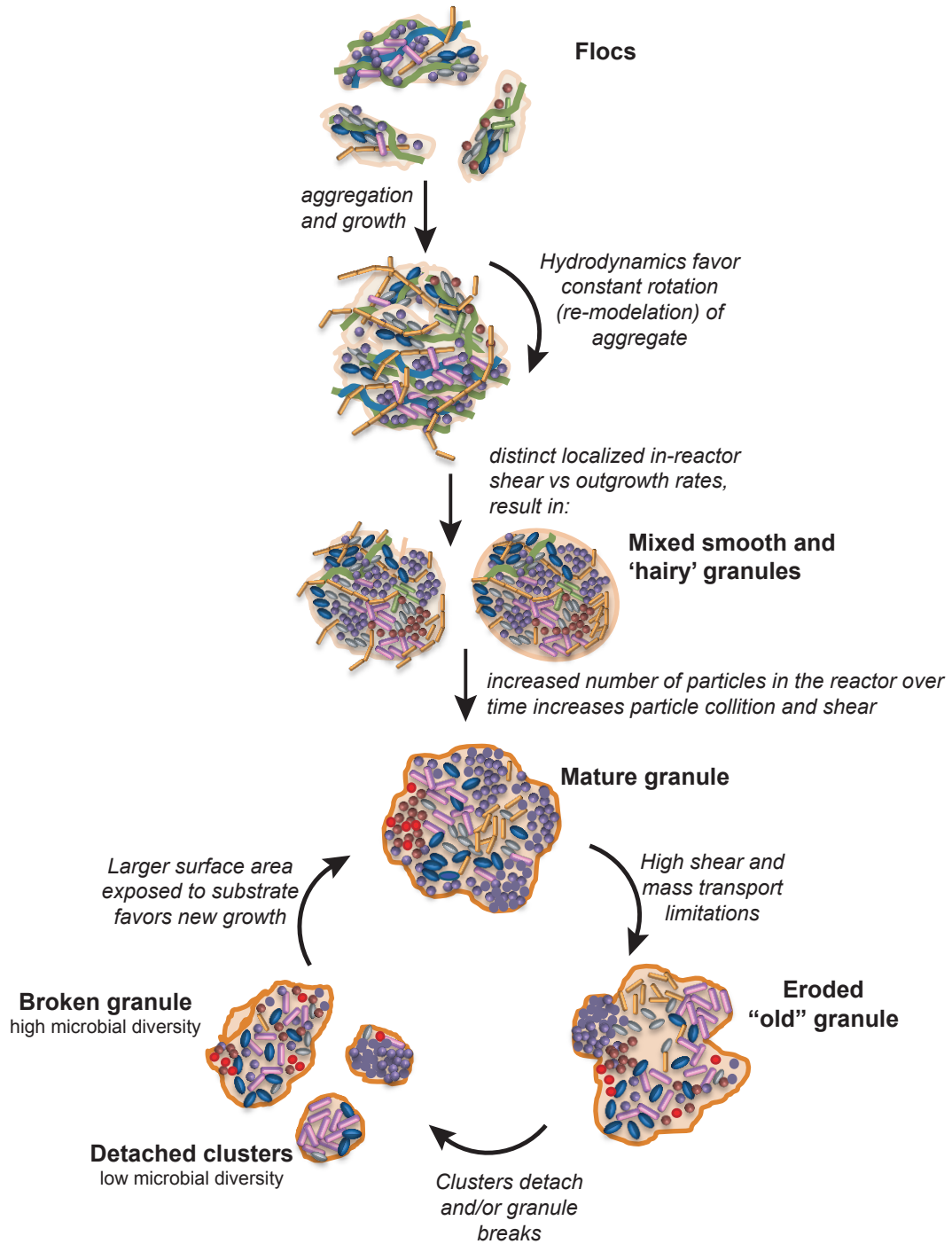# Initial formation and life cycle of granules

Figure S1. Proposed mechanisms for the initial formation and life cycle of aerobic granules cultivated in bubble column sequencing batch reactors.

Figure S2. Images of thin slices from a granule. The thickness of each slice was 12 μm. Reading of images is from left to right and top to bottom. The upper right image corresponds to the outer zone of the granule and the bottom left image corresponds to the center of the granule.

Supporting material

The microbial landscape and architecture of aerobic granules, their life stages and practical implications
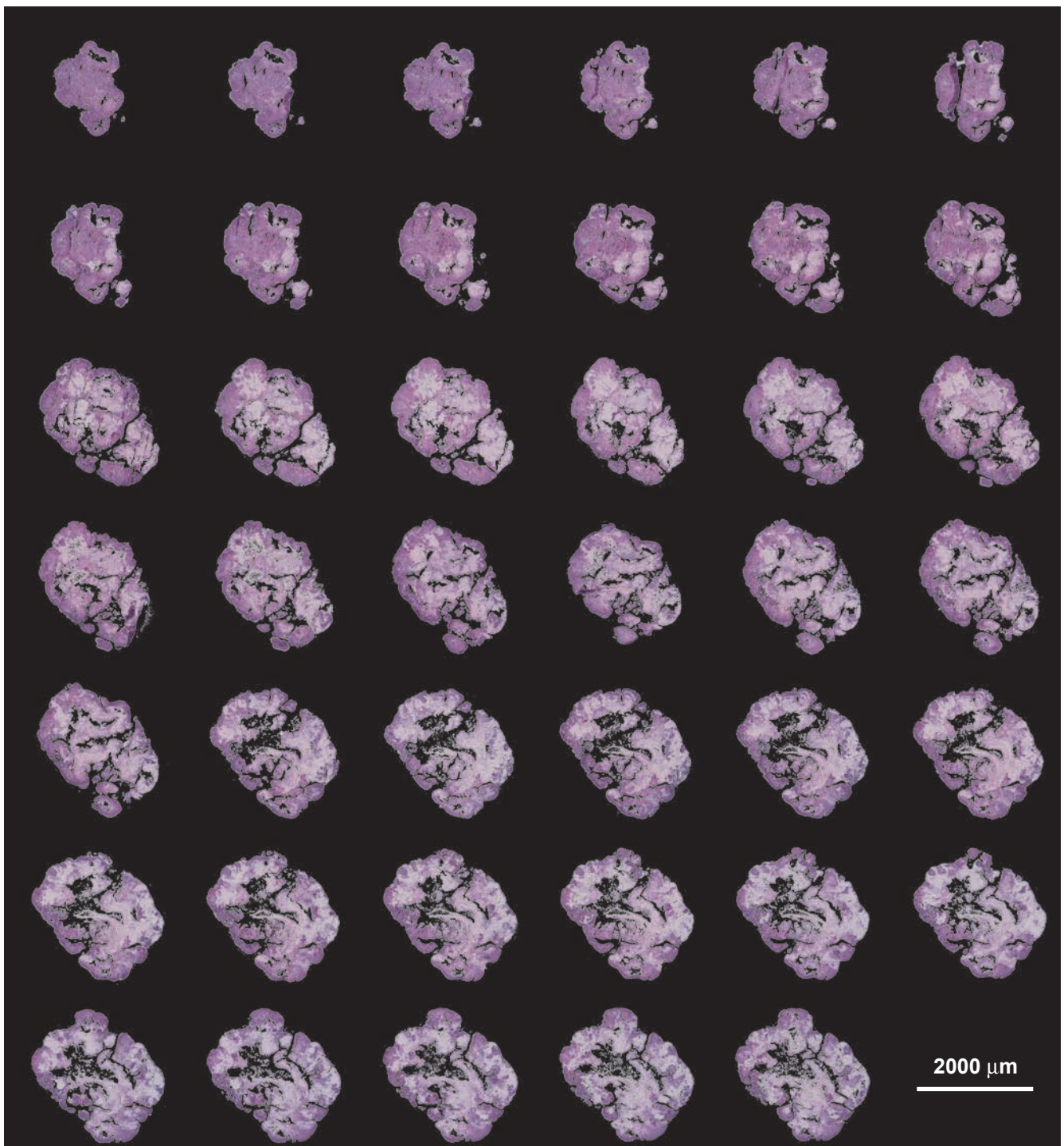
Gonzalez-Gil G. and Holliger C.

Porosity estimation

From each thin (12 μm) section corresponding to the different radial locations of the granule, thresholding was applied and binary images were obtained. From the binary image at each location, a mask representing the total area of the granule (Fig.S3 A) and a mask representing the void space (Fig. S3 B) were obtained. From these masks, the porosity was calculated as the percentage of void area with respect to the total area of the granule section. Details of similar calculations are shown in (Yang et al 2000). For processing and calculations, we used built-in functions in ImageJ.
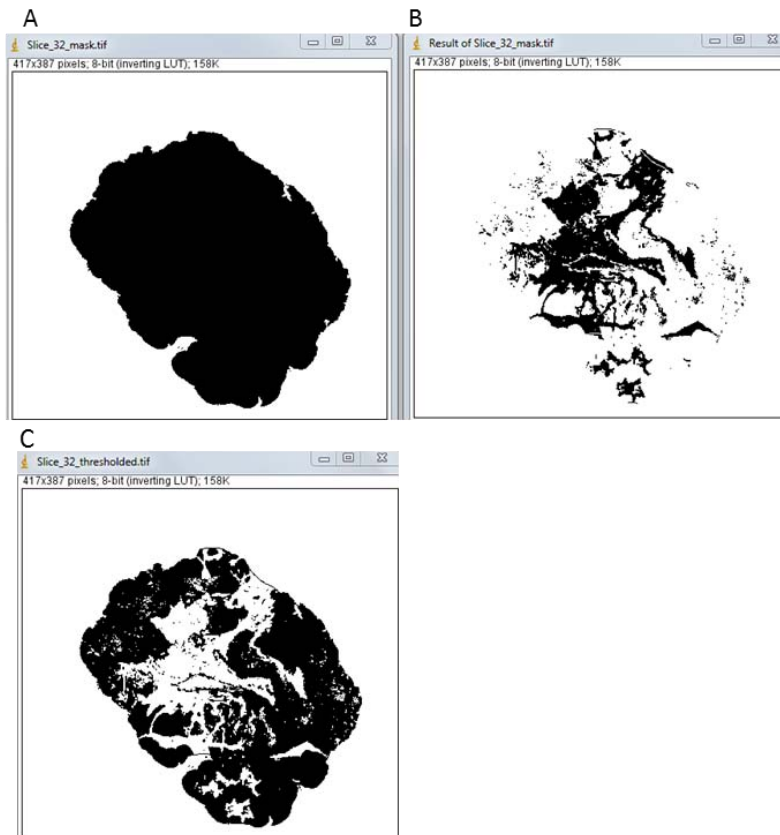
A
Slice_32_mask.tif
417x387 pixels; 8-bit (inverting LUT); 158K

B
Result of Slice_32_mask.tif
417x387 pixels; 8-bit (inverting LUT); 158K

C
Slice_32_thresholded.tif
417x387 pixels; 8-bit (inverting LUT); 158K

Figure S3. A) Mask representing the total area of a thin section of the granule. B) Mask representing the void space. The void space mask results from applying an XOR (i.e. exclusive or) calculation using the original thresholded image (C) and the total area mask.

Supporting material

The microbial landscape and architecture of aerobic granules, their life stages and practical implications

Gonzalez-Gil G. and Holliger C.

Movie Legend

Supporting movie: 3-D rendering of half aerobic granule showing the interior cavern-like structure. A set of 41 slices of 12 μm each was used for reconstruction.