

Supplementary Appendix 1: A methodology for morphological feature extraction and unsupervised cell classification

Mathematical Morphology: Erosion and Dilation

Here we define mathematical morphology operations on binary images used to produce Fig. 2(c) in the main text.

Erosion of image A by structural element (abbreviated “strel”) B , resulting in image E is defined as:

$$A \ominus B = \{z \in E | B_z \subseteq A\},$$

where B_z is the translation of B by the vector z :

$$B_z = \{b + z | b \in B\}, \forall z \in E.$$

In practice, erosion leads to shrinking or thinning of the binary image. Dilation of image A by structural element B , resulting in image E is defined as:

$$A \oplus B = \bigcup_{z \in B} A_z,$$

where A_z is the translation of A by the vector z :

$$A_z = \{a + z | a \in A\}.$$

Dilation is used to grow or thicken regions in a binary image. All other morphological operations can be defined by composing erosions and dilations.