**IVEN2.0 Selection of cavity points in the evaluation of cavity adjacent points**August 2023  
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This guide offers some advice regarding the selection of cavity points using the IVEN2 GUI. This feature was developed to enable to semi-automatic identification of ‘cavity-adjacent’ cells.

**Selection of approximate cavity adjacent points**

This step in the IVEN2 analysis is to obtain coordinates of points located **within** the cavity which are later used in the automatic detection of cavity adjacent cells.

The user is asked to manually select cells they suspect of being cavity adjacent, when the user then confirms their selection, a cross marker is placed at the mean point between the select points. Therefore, the initial selection of suspected cavity adjacent cells does not need to be 100% accurate and can also be a subset of cavity adjacent points, see two-dimensional example in figure 1.

A screenshot of a computer

Description automatically generated

Figure Two 2D examples of selecting cavity points. a) Example where the user selected all suspected cavity adjacent cells with a single resulting cavity point. b-d) Example where the user selects 2 subsets of the cavity adjacent cells to obtain two cavity points (yellow + purple).

In most cases it will be very difficult to select all cavity adjacent cells accurately. Therefore, we suggest taking the second approach (example two). By using multiple subsets of suspected cavity adjacent cells, you should obtain a better description of the cavity and there more accurate identification of cavity adjacent cells in the final step.

After identification of cavity points. The Delaunay triangulation is subsequently re-created, **including** the cavity points. Any cells found to be connected to the cavity points within the Delaunay triangulation are thereby considered cavity-adjacent points.

**Summary:**

* This stage within the IVEN2 analysis is not essential, it can be skipped for samples with no cavity present.
* Multiply cavity points can be selected and multiple cavities can be identified within this step.
  + Currently there is no distinction between cavity-adjacent points i.e. no data is recorded about which cavity point a cell is connected to within the Delaunay triangulation.
* We suggest for larger cavities (where the diameter of the cavity is larger than a cell diameter within the sample), that multiple cavity points are generated by using subsets of points (as in Example 2 in figure 1).