Degenerate polygonal tilings in simple animal tissues PRIMOZ
ZIHERL, University of Ljubljana & Jozef Stefan Institute, ANA HOCEVAR, Jozef
Stefan Institute — We study 2D polygonal tilings as models of the en-face structure
of single-layer biological tissues. Using numerical simulations, we explore the phase
diagram of equilibrium tilings of equal-area, equal-perimeter convex polygons whose
energy is independent of their shape. We identify 3 distinct phases, which are all
observed in simple epithelial tissues: The disordered phase of polygons with 4-9
sides, the hexatic phase, and the hexagonal phase with perfect 6-fold coordination.
We quantify their structure using Edwards' statistical mechanics of cellular systems.

Primoz Ziherl
University of Ljubljana & Jozef Stefan Institute