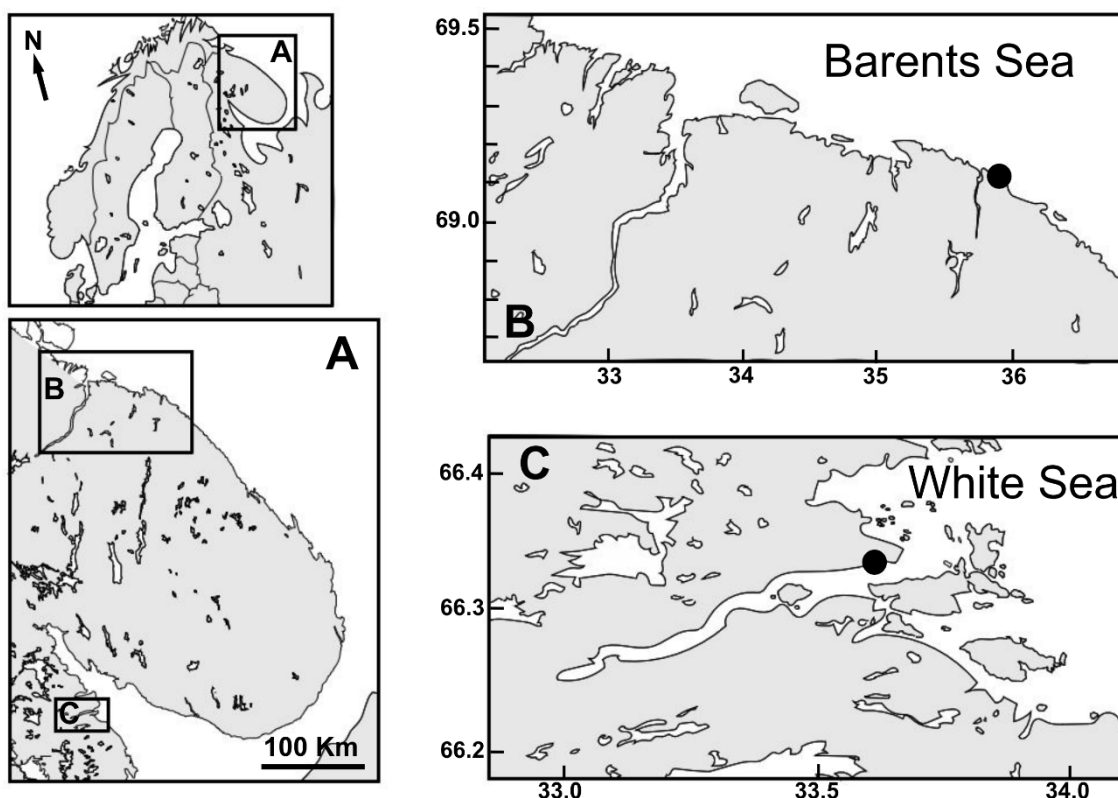
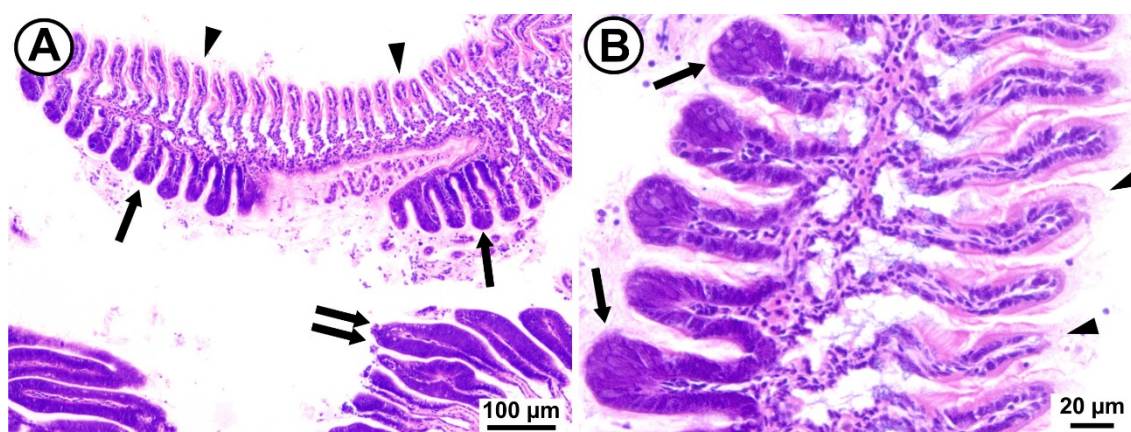


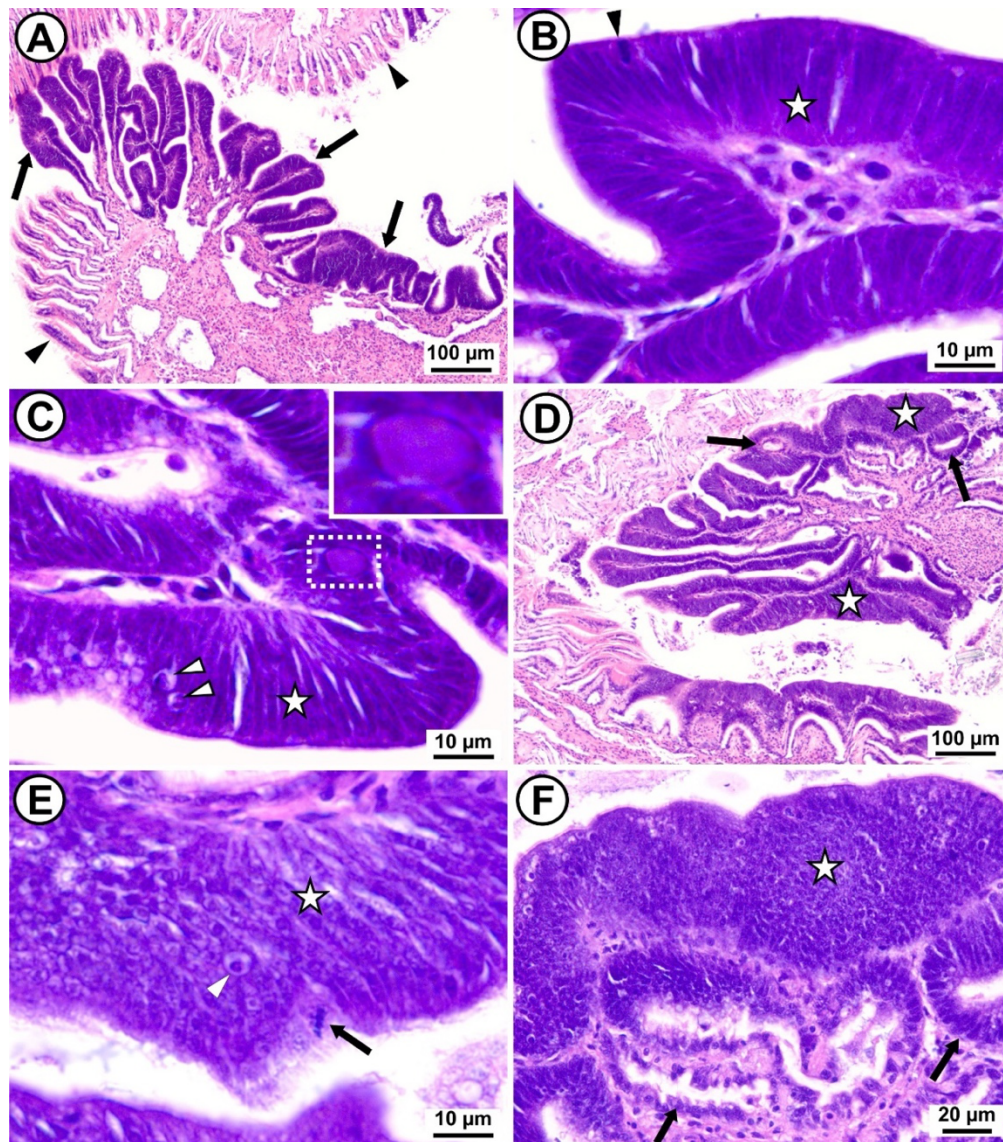
**SUPPLEMENTARY FIGURES**



**Fig. S1.** Locations of the sampled populations, one in Dal'niy Plyazh beach, in the Barents Sea (map B), and the other in Sel'dyanaya Bight, in the White Sea (map C).



**Fig. S2.** Gills of the soft-shell clam *Mya arenaria* “MYAw16”. A: Area of a branchial lamella (upper half) showing filaments with hyperchromatic epithelia (arrows), and other filaments with the normal (healthy) appearance (arrowheads); the bottom half shows areas of abnormal epithelial proliferation (double arrow) corresponding to another branchial lamella. B: Magnification of (A) showing all the filaments on the left with hyperchromatic epithelium (arrows), which includes abundant hypertrophied nuclei, while the filaments on the right have normal (healthy) appearance (arrowheads).



**Fig. S3.** Gills of soft-shell clams *Mya arenaria* with abnormal epithelial proliferation. A: Clam “MYAw15” showing an area of abnormal proliferation (arrows), in which epithelium shows marked hyperchromatism, lacks cilia and is thicker than the simple, ciliated epithelia of the branchial filaments in areas with normal branchial architecture (arrowheads). B: Magnification of (A) showing hyperchromatic, pseudostratified epithelium (star), lacking cilia on its surface; a mitotic figure (arrowhead) is visible in the distal border. C: Magnification of (A) showing hyperchromatic, pseudostratified epithelium (star), with abundant apoptotic cells (arrowheads) and lacking cilia on its surface; the top right inset corresponds to higher magnification of the area framed with dotted line, showing a hypertrophied nucleus with dense eosinophilic content and peripheral chromatin. D: Clam “MYAw16” showing abnormal tissue proliferation, involving branching and furrowing, as deduced from sections of holes (arrows); the abnormal epithelium shows hyperchromatism and stratification (stars). E: Magnification of (D) showing hyperchromatism, stratification (star), apoptotic cells (arrowhead), a mitotic figure (arrow) in the distal border, and lacking cilia on its surface. F: Magnification of (D) showing hyperchromatic, stratified epithelium (star) lacking cilia on its surface; arrows point out epithelial contours with central lumen likely corresponding to sections of holes or furrows.