$$u_x \qquad u_y$$
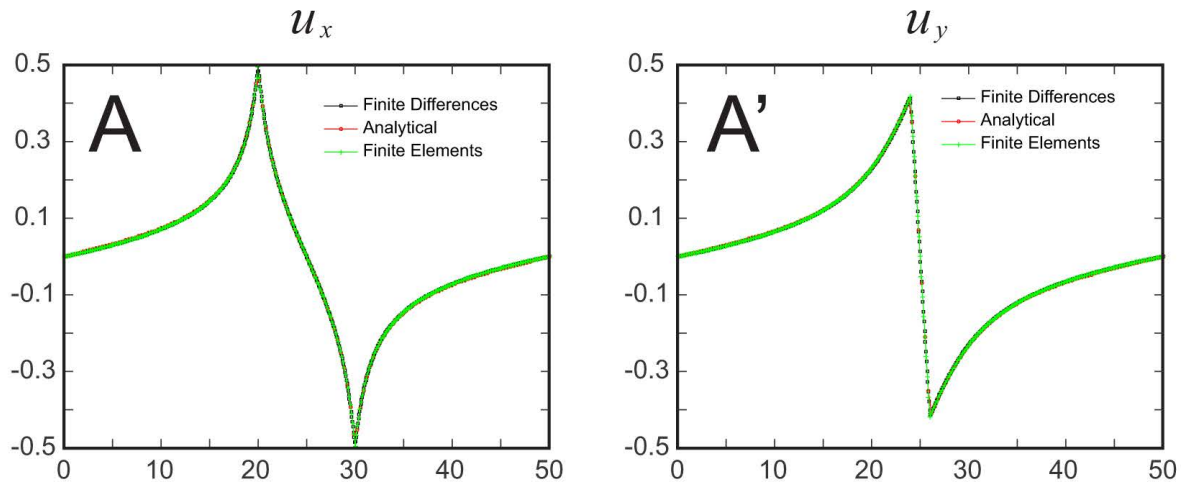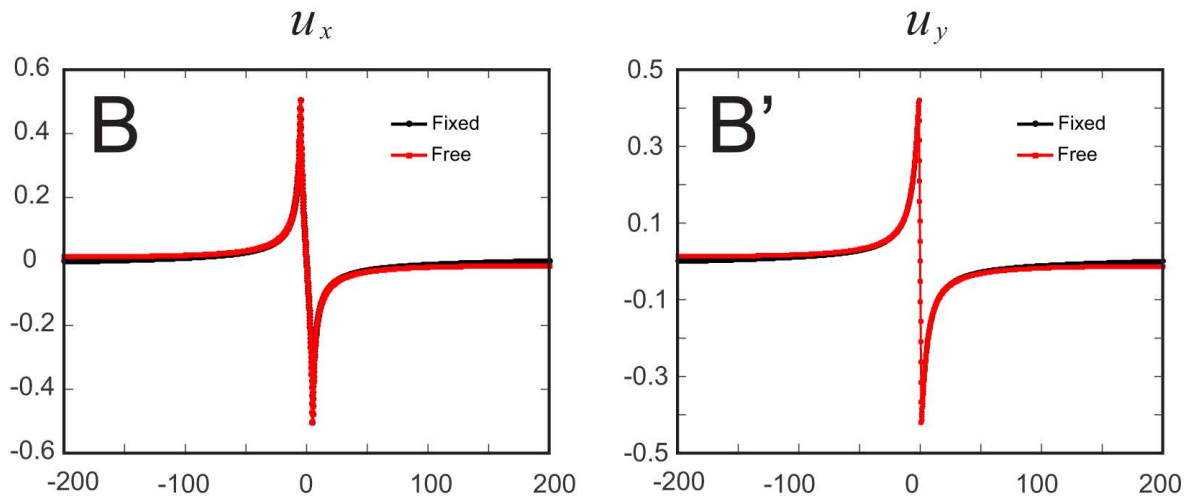

Figure S1

Color plots showing the magnitude of deformation calculated in Figures 2b,c.
a). The x-component of the deformation field (u_x) is shown with red colors
(positive values) indicating rightwards displacement, and blue colors (neg-
ative values) indicating leftwards displacement. b). The y-component of
the deformation field u_y; red (positive) indicates upwards displacement, blue
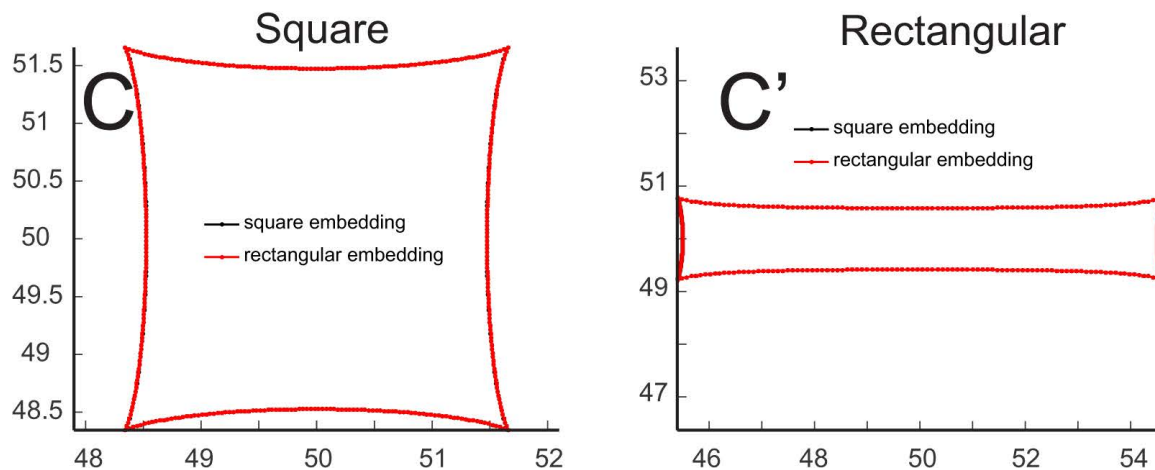(negative) indicates downwards displacement.

Numerics vs analytics

u_x


u_y

Fixed vs free boundaries (using finite elements)

u_x

u_y

Square vs rectangular embedding
(from analytical expressions)

Square

Rectangular

Figure S2

Convergence of solution with respect to the boundary conditions. a). Validation of the numerical scheme. x- and y-components of the displacement field (u_x and u_y) along the vertical and the horizonal cross sections of the simulated domain (at equilibrium). Three curves compare results using two numerical schemes (finite differences and finite elements) and the analytical results using Fourier expansion. Parameters are as in Figure 2b. b). x- and y-components of the displacement field for the case of fixed (black) and free (red) boundary conditions obtained using finite elements. Note particularly close agreement in the vicinity of the contractile domain. All parameters except domain size as in Figure 2b. c). Final shapes of square and rectangular contractile domains embedded in either square or rectangular stress-free domains. The dimensions of the embedding domains were taken to be either 100x100 or 200x100. Initial size of the contractile domain is either 4x4 (left) or 10x2 (right). The two curves essentially coincide, indicating that the geometry of the contractile domain is essentially independent of the boundary conditions (for the chosen domain sizes).
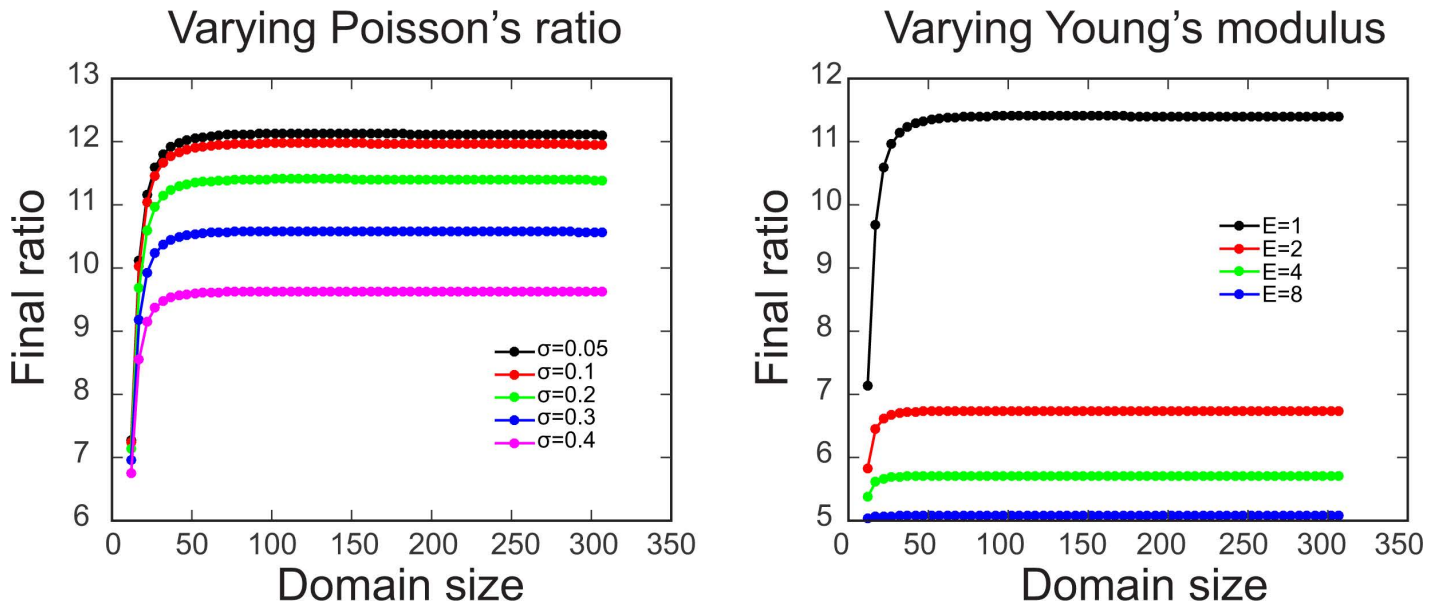
Figure S3

Convergence of the aspect ratio of the contractile domain in the limit of large embedding domain (plotted using analytical expressions). Left: Equilibrium aspect ratio as a function of embedding domain size and Poisson's ratio. Right: Equilibrium aspect ratio as a function of embedding domain size and Young's modulus. For both plots, the length of the embedding domain is labeled on the x-axis; its width is smaller by 8 units (the difference between the length and the width of the contractile domain). The curves were plotted using the Fourier-expansion given in the appendix. Parameters are as in Figure 2b.
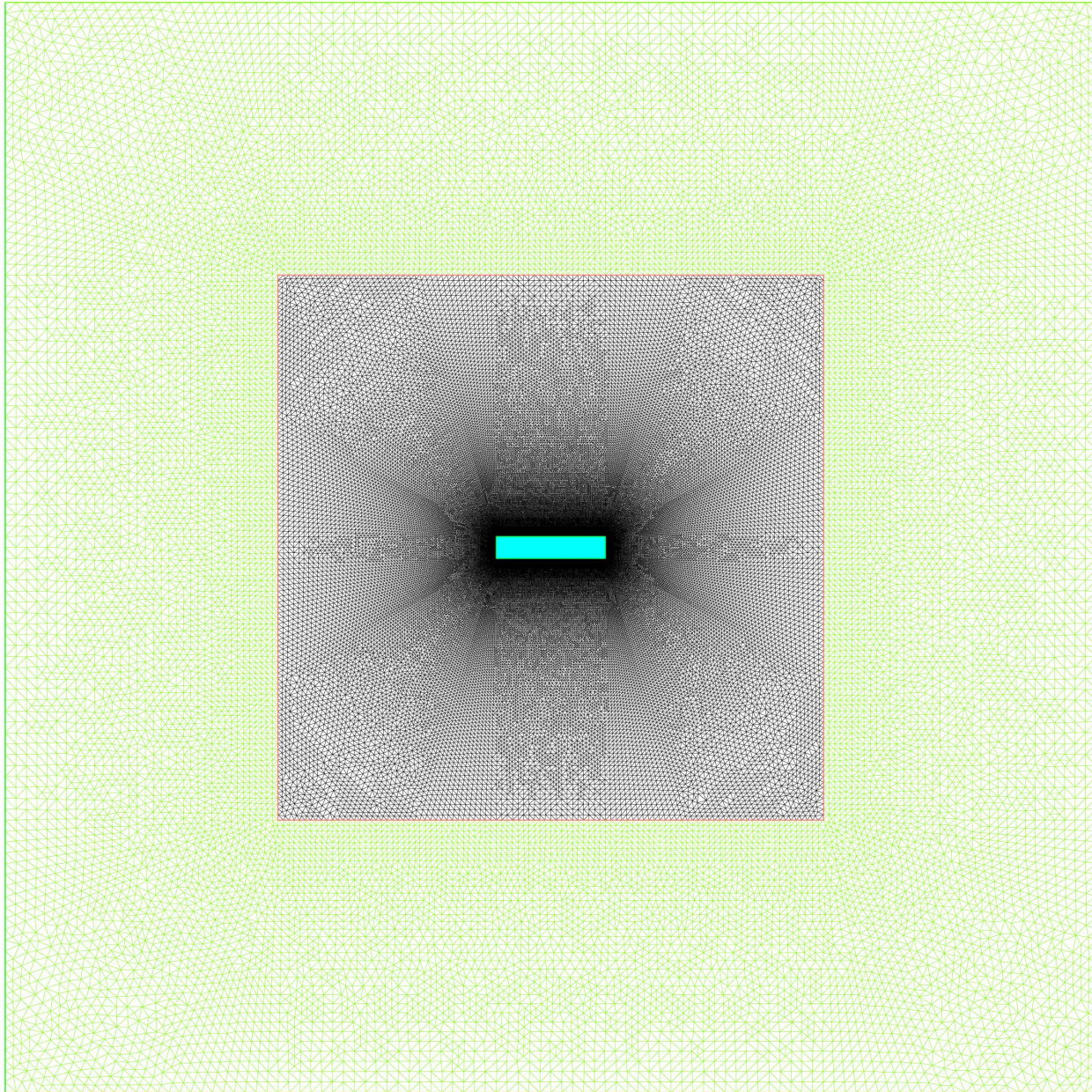
Figure S4

Finite element mesh used for calculation in Figure S2b.

Click here to Download Supplemental code files