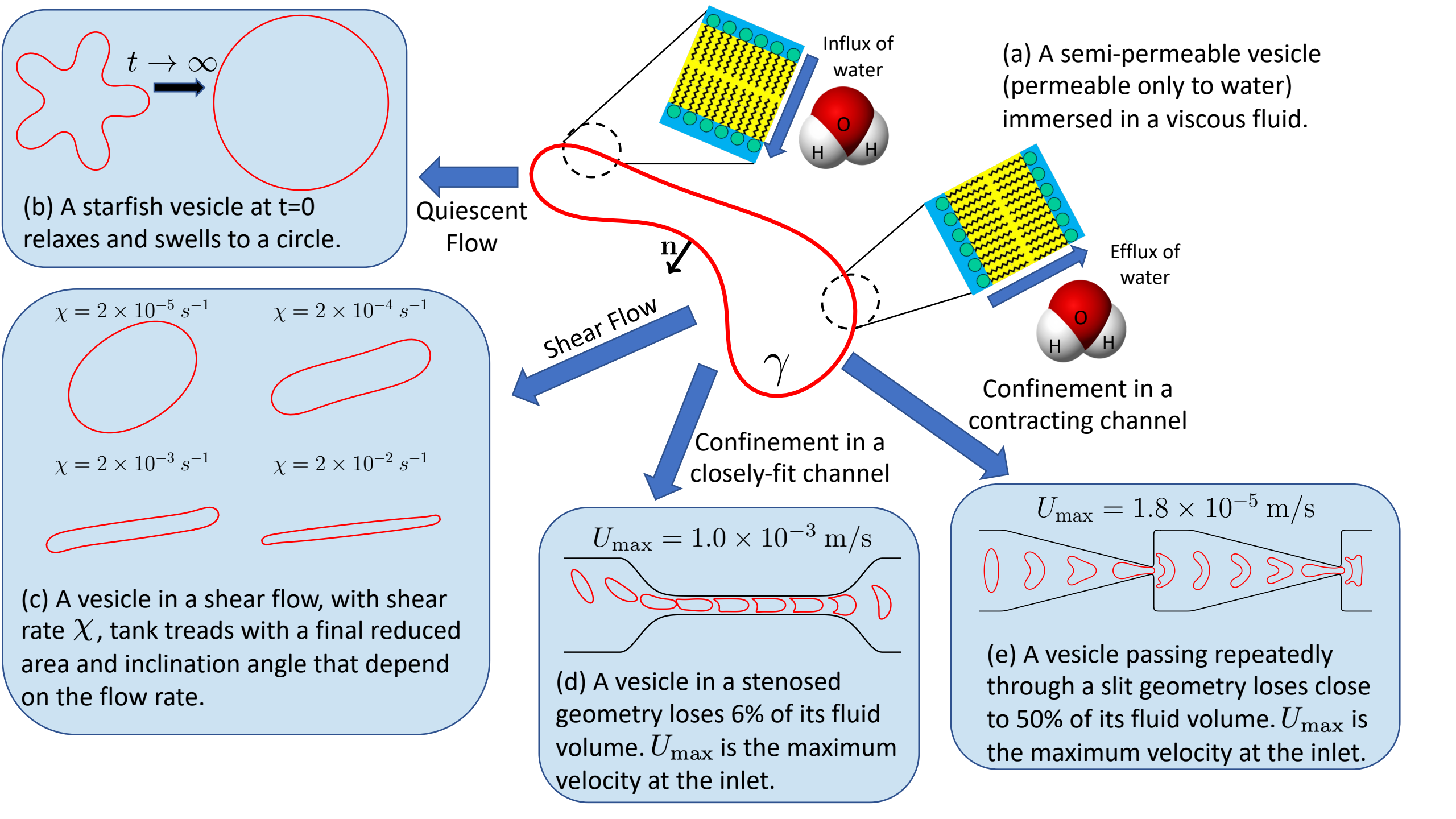
Influx of water
O
H
H
(a) A semi-permeable vesicle (permeable only to water) immersed in a viscous fluid.
$t \to \infty$
(b) A starfish vesicle at t=0 relaxes and swells to a circle.
Quiescent Flow
n
Shear Flow
γ
Efflux of water
O
H
H
Confinement in a contracting channel
$\chi = 2 \times 10^{-5}\ s^{-1}$
$\chi = 2 \times 10^{-4}\ s^{-1}$
$\chi = 2 \times 10^{-3}\ s^{-1}$
$\chi = 2 \times 10^{-2}\ s^{-1}$
(c) A vesicle in a shear flow, with shear rate χ, tank treads with a final reduced area and inclination angle that depend on the flow rate.
Confinement in a closely-fit channel
$U_{\max} = 1.0 \times 10^{-3}$ m/s
(d) A vesicle in a stenosed geometry loses 6% of its fluid volume. $U_{\max}$ is the maximum velocity at the inlet.
$U_{\max} = 1.8 \times 10^{-5}$ m/s
(e) A vesicle passing repeatedly through a slit geometry loses close to 50% of its fluid volume. $U_{\max}$ is the maximum velocity at the inlet.