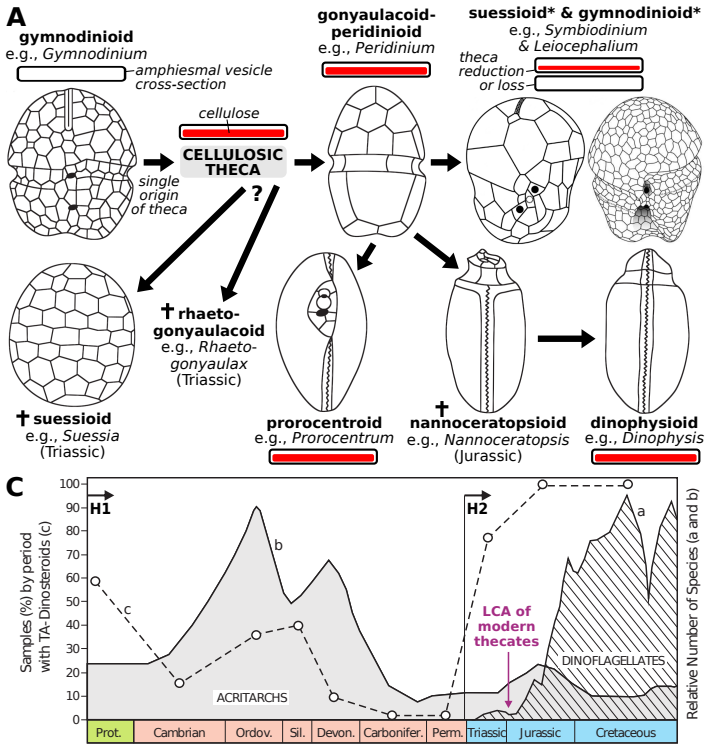
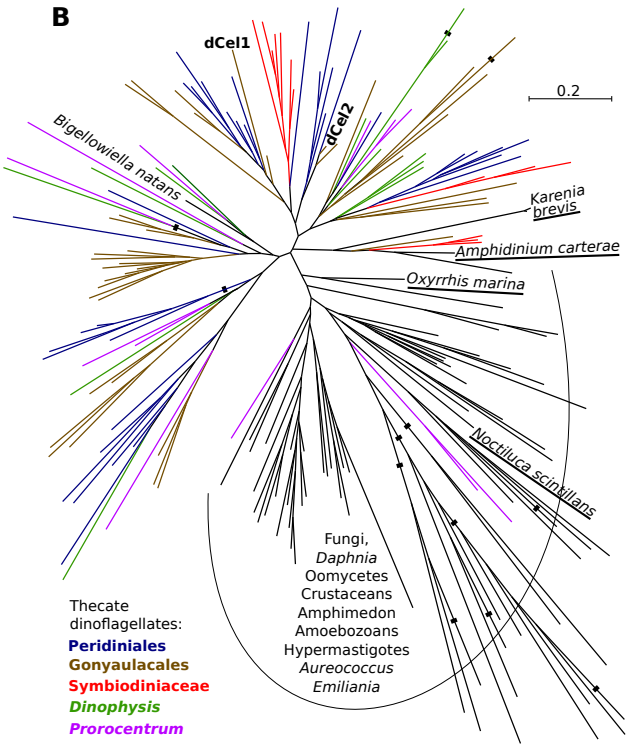

A
gymnodinioid
e.g., Gymnodinium
amphiesmal vesicle cross-section
cellulose
CELLULOSIC THECA
single origin of theca
?
gonyaulacoid-peridinioid
e.g., Peridinium
suessioid* & gymnodinioid*
e.g., Symbiodinium & Leiocephalium
theca reduction or loss
† suessioid
e.g., Suessia
(Triassic)
† rhaeto-gonyaulacoid
e.g., Rhaeto-gonyaulax
(Triassic)
prorocentroid
e.g., Prorocentrum
† nannoceratopsioid
e.g., Nannoceratopsis
(Jurassic)
dinophysioid
e.g., Dinophysis

C
H1
H2
Samples (%) by period with TA-Dinosteroids (c)
Relative Number of Species (a and b)
ACRITARCHS
DINOFLAGELLATES
LCA of modern thecates
Prot.
Cambrian
Ordov.
Sil.
Devon.
Carbonifer.
Perm.
Triassic
Jurassic
Cretaceous


B
dCel1
dCel2
0.2
Bigellowiella natans
Karenia brevis
Amphidinium carterae
Oxyrrhis marina
Noctiluca scintillans
Fungi,
Daphnia
Oomycetes
Crustaceans
Amphimedon
Amoebozoans
Hypermastigotes
Aureococcus
Emiliania
Thecate dinoflagellates:
Peridiniales
Gonyaulacales
Symbiodiniaceae
Dinophysis
Prorocentrum