

MUNI  
MED

# EXCITATION-CONTRACTION COUPLING

E-C coupling

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# DEFINITION

Events connecting electrical activity of the heart (depolarization of sarcolemma), **EXCITATION**

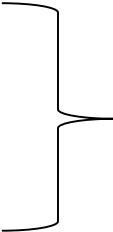
and its mechanical response, **CONTRACTION**

Link between these events is **Ca<sup>2+</sup>**

## FUNCTION

- Triggering of contraction
- Regulation of contraction force

# KEY STRUCTURES / ORGANELLES / RECEPTORS

- Transverse tubules of sarcolemma (T-tubules)
  - Sarcoplasmic reticulum (SR)
- 
- SARCOTUBULAR SYSTEM**
- Calcium channels:

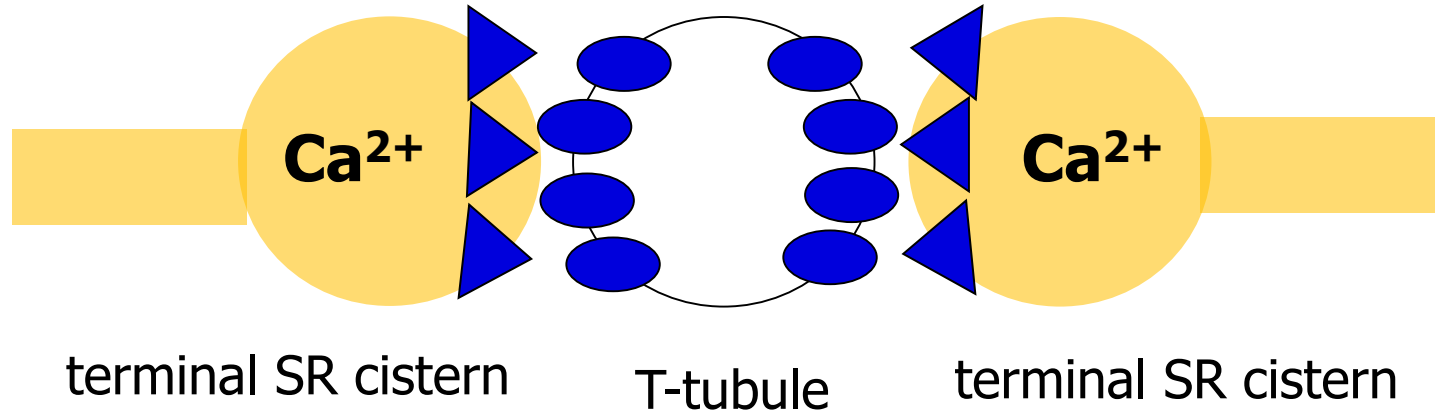
**DHPR** (dihydropyridine receptor) in T-tubules/sarcolemma

**RYR** (ryanodine receptor) in SR

# FUNCTIONAL ORGANISATION of SARCOTUBULAR SYSTEM

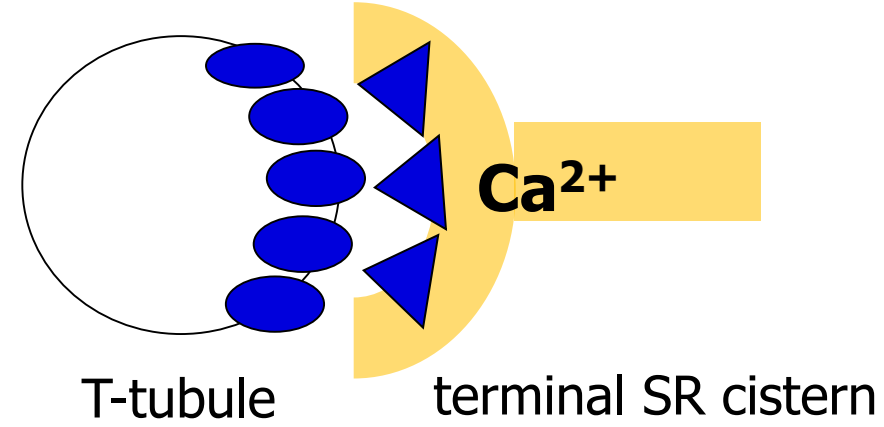
## RHABDOMYOCYTE

### TRIAD



## CARDIOMYOCYTE

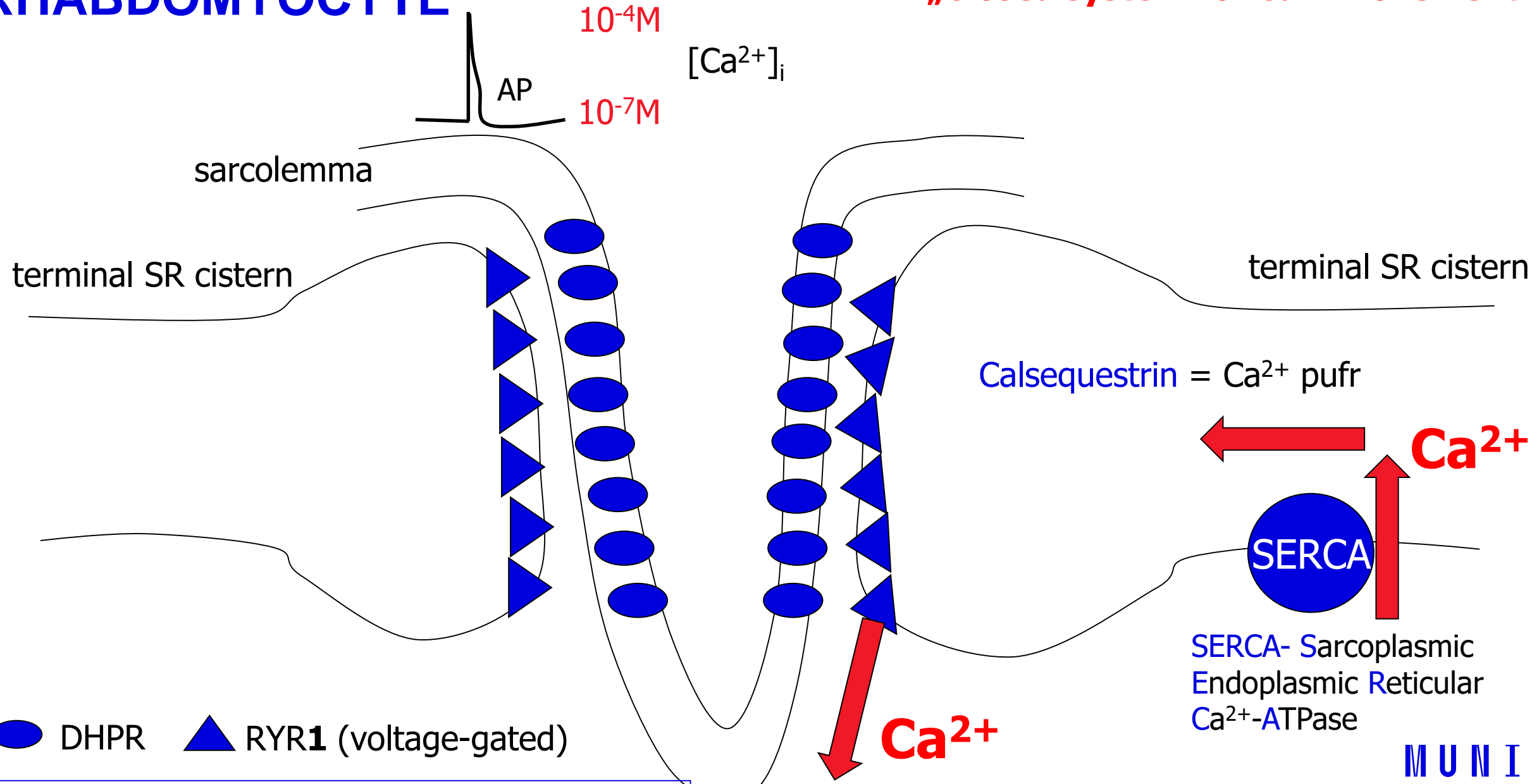
### DIAD



● DHPR      ▲ RYR

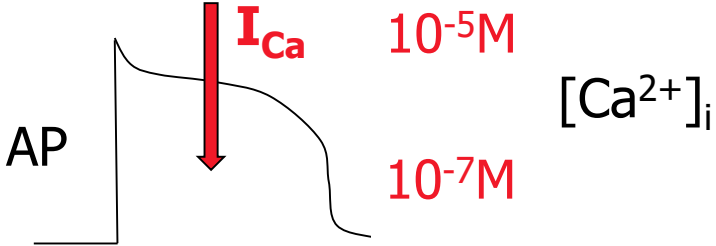
# RHABDOMYOCYTE

„Closed system“ of  $Ca^{2+}$  movement



„Mechanical“ relation between DHPR and RYR

# CARDIOMYOCYTE



**„Open system“ of  $Ca^{2+}$  movement**  
**Strong dependence on  $[Ca^{2+}]_e$  !**

