

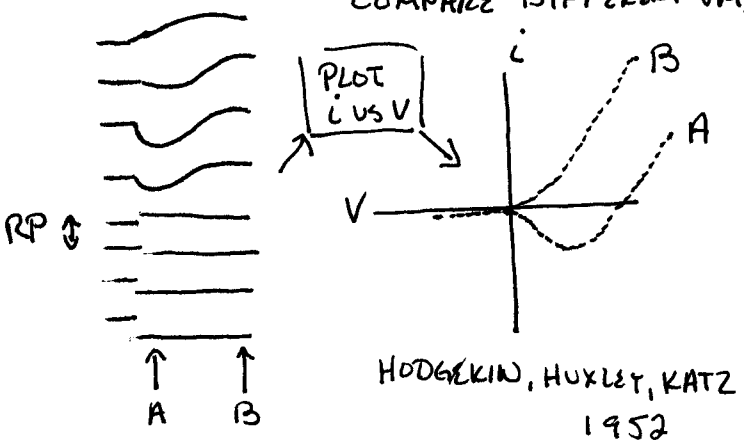
- 0 THRESHOLD
- 1 FAST RISE
- 2 AUTO REVERSE
- 3 FAST FALL
- 4 ~~RE~~ UNDER SHOOT
- 5 RETURN TO BASELINE (RP)

HODGKIN & HUXLEY 1939

CURRENTS

HOLD A CHOSEN V_m
VOLTAGE CLAMP - OBSERVE CURRENT VS TIME

COMPARE DIFFERENT V_m s



Na^+ conductance -
EARLY / FAST // REVERSIBLE $\frac{IN}{OUT}$
SELF INACTIVATING

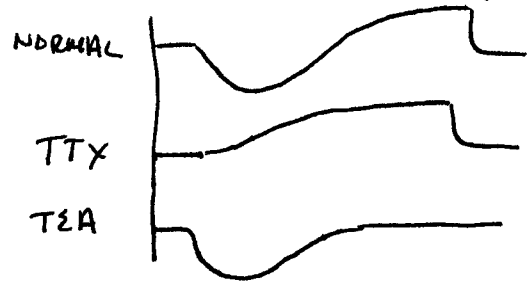
K^+ conductance
DELAYED // SINGLE DIRECTION $\frac{OUT}{IN}$
"DELAYED RECTIFIER"

HILLE-1970

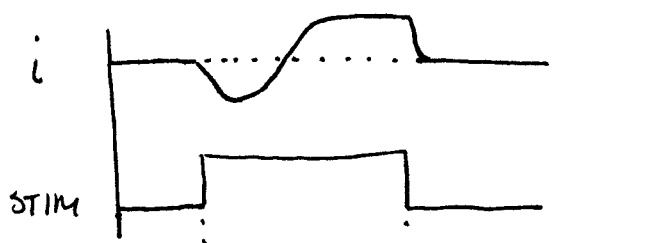
TTX - tetrotoxin - BLOCKED Na^+ channels

TEA - triethyl ammonium ion
BLOCKED K^+ channels

TTX eliminated Na^+ component

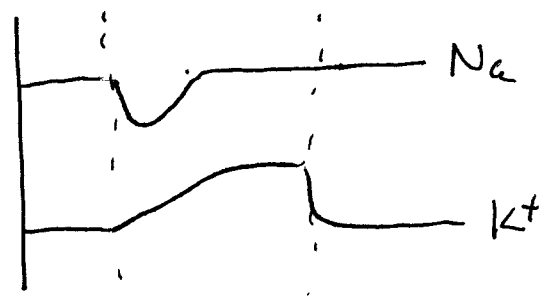


TEA eliminated K^+ component



ION REPLACEMENT EXPERIMENTS

HYPOTHESIS \Downarrow



NOW... ION CHANNELS

- ① TISSUE? ELECTRIC FISH / RHODOSPHERA
- ② Na^+ channel - purified from electric fish - ~~assay~~: ~~TTX~~
TTX BINDING
- ③ GENERAL STRUCTURE // PROPERTIES
- ④ K^+ channel - developmental genetics in FRUITFLY
SHAKER MUTATION
 K^+ channel diversity