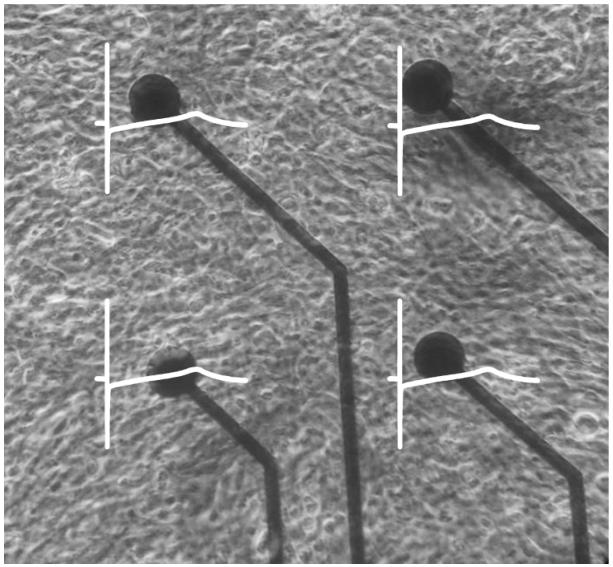
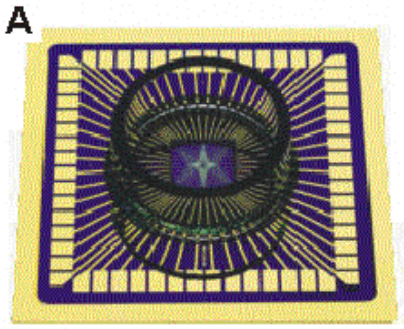


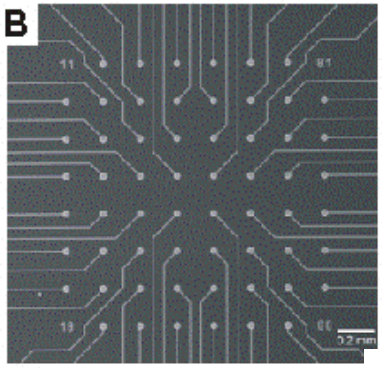
Dr. Udo Kraushaar

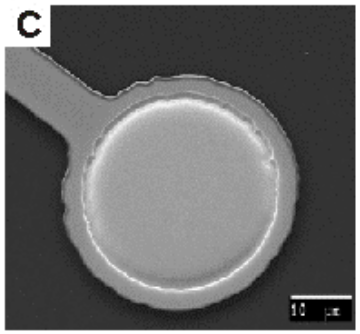
Field action potential recordings of primary atrial and ventricular cardiomyocytes on microelectrode array (MEA)

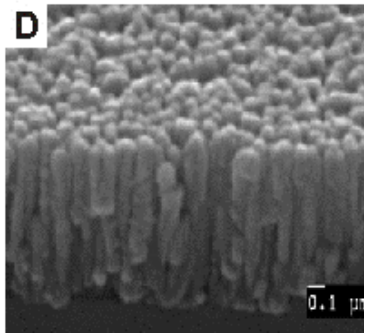
Natural and Medical Sciences Institute
at the University of Tübingen

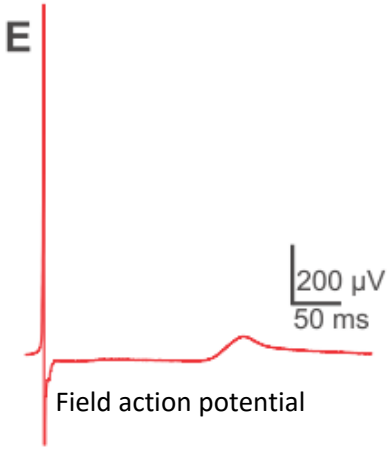
Field action potentials on microelectrode arrays



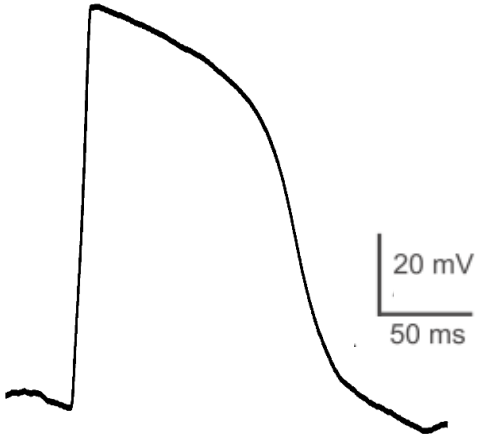




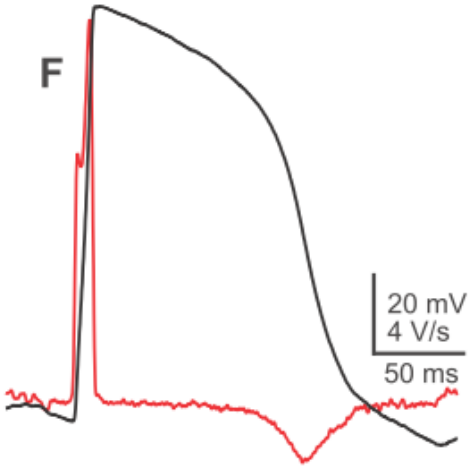




Field action potential



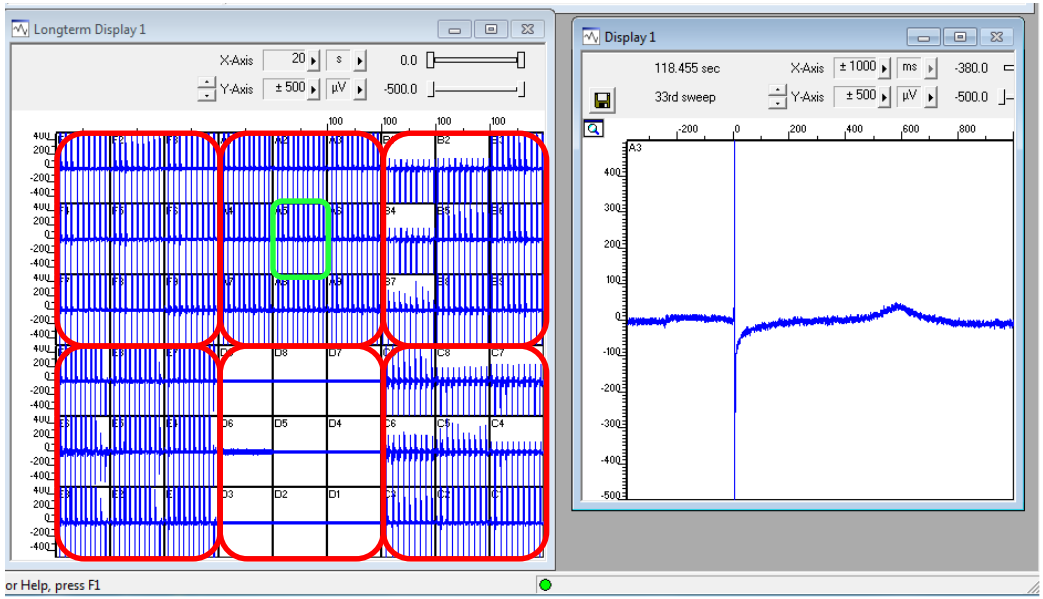
Intracellular action potential



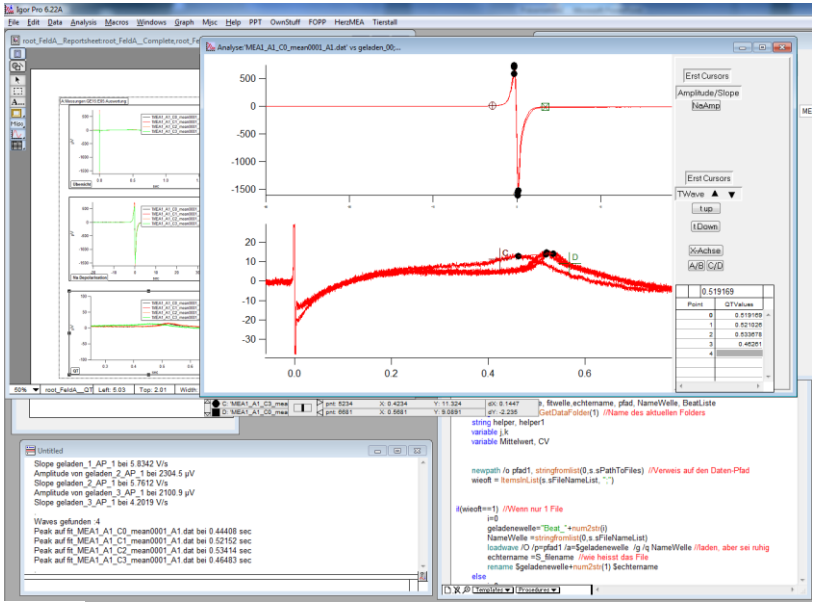
Intracellular AP
1st derivative

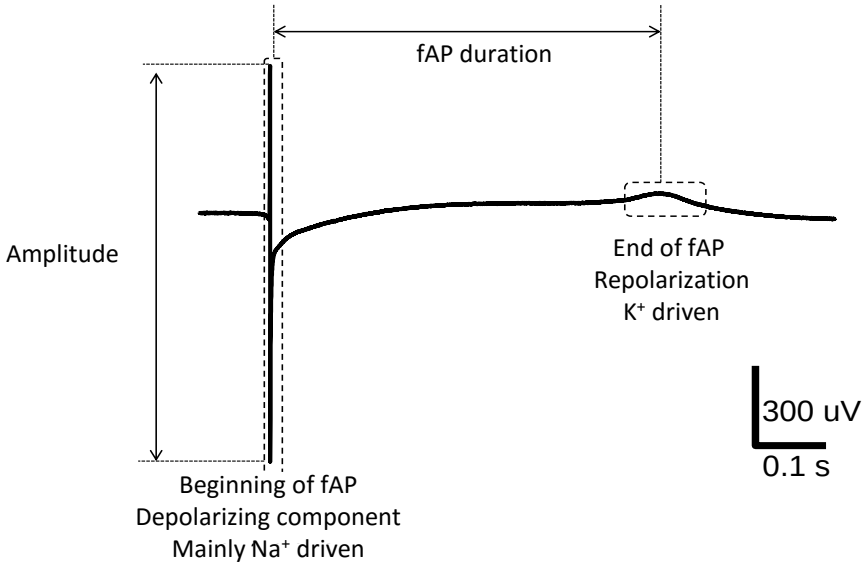
Analysis

McRack: Recording, averaging and data export



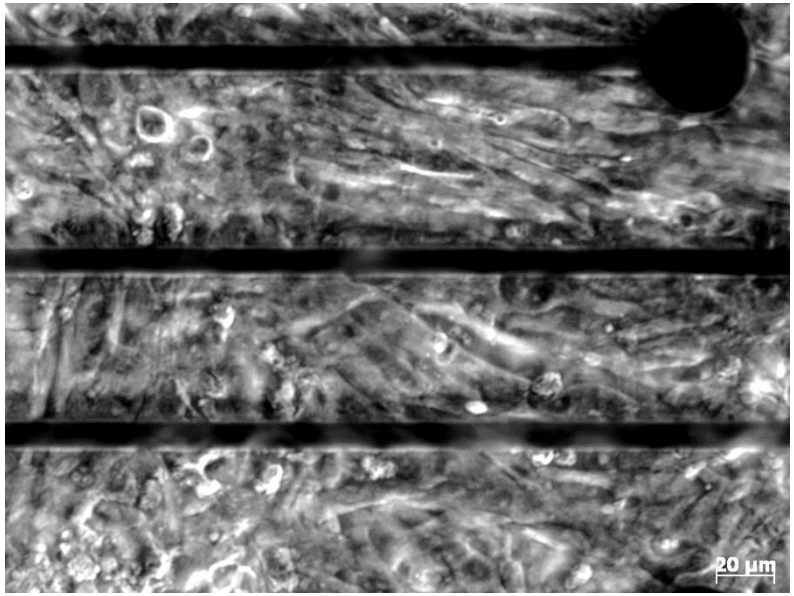
Igor Pro: Self written analysis

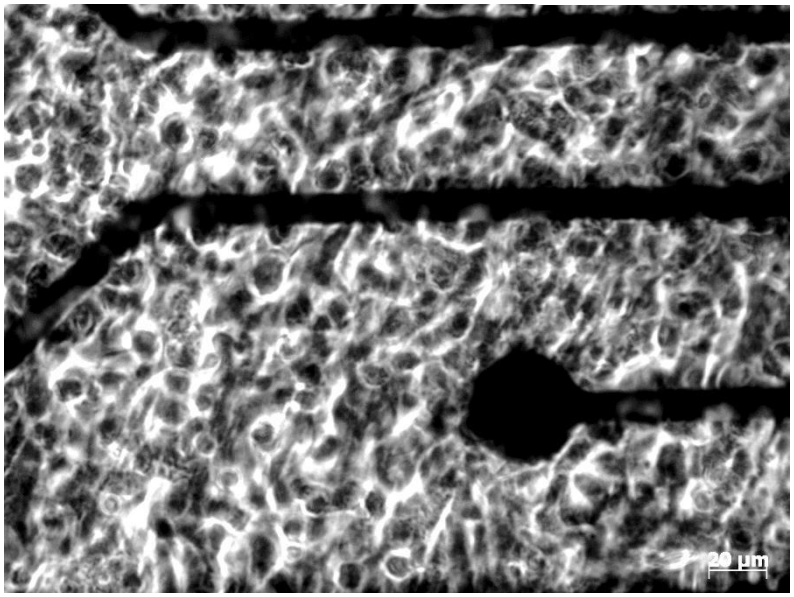


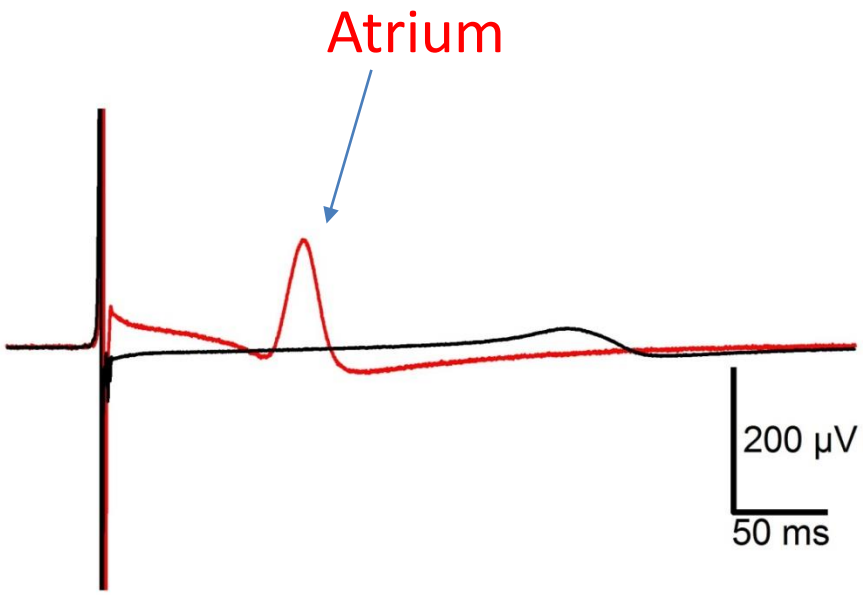


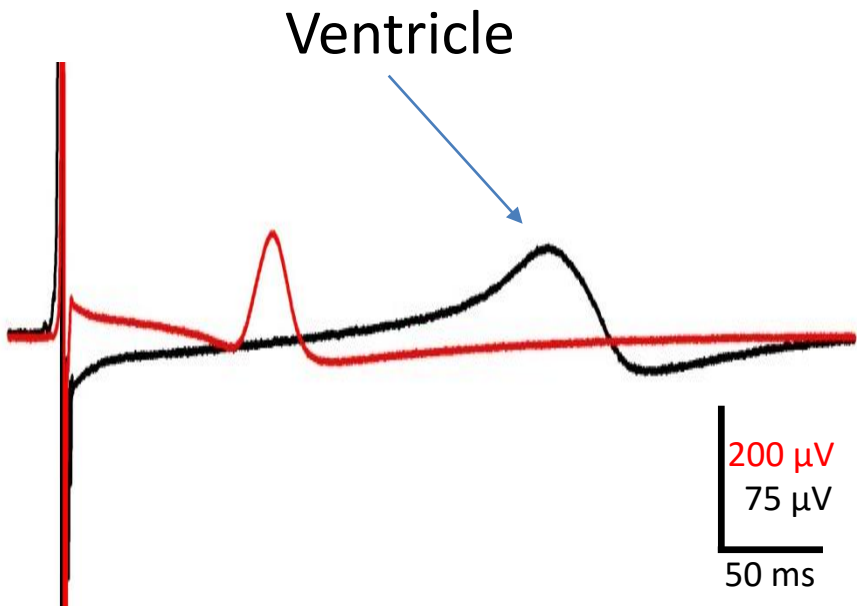
- **Amplitude** of the initial phase of the fAP
- **Duration** of the fAP
- Spontaneous **beat frequency**
- Beat-to-beat **regularity**

Morphological and electrical differences between atrial and ventricular cardiomyocytes

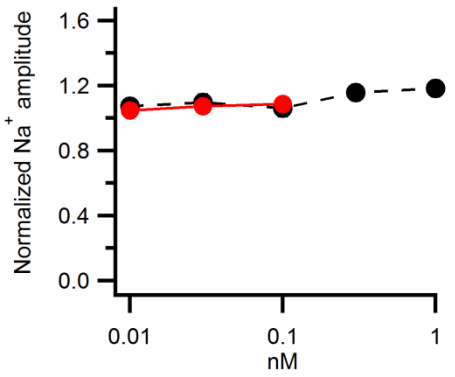


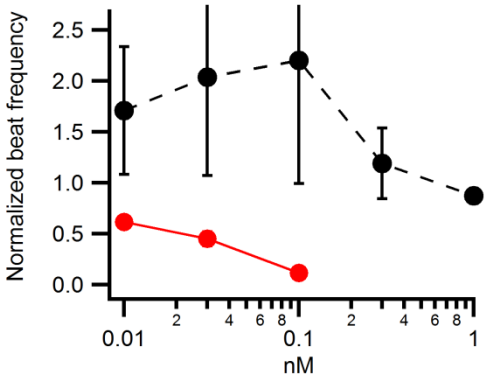


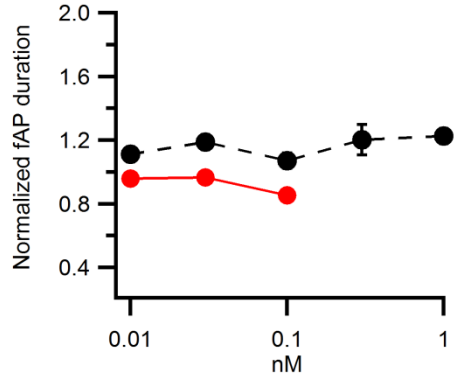


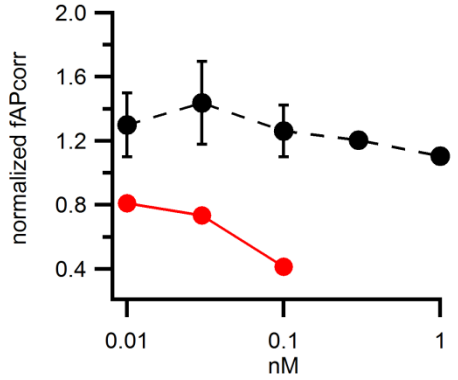


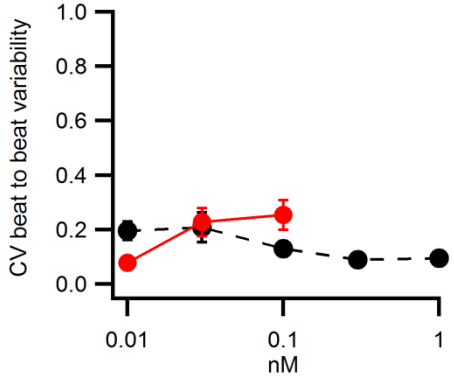
Compound application: Carbachol









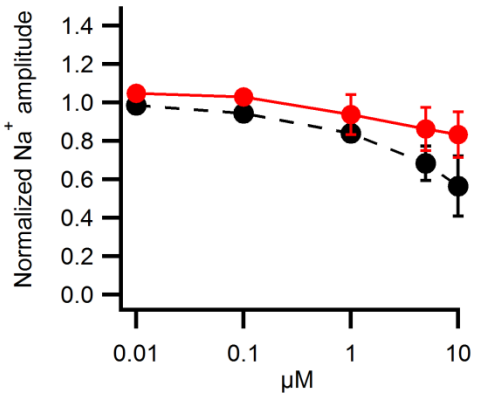


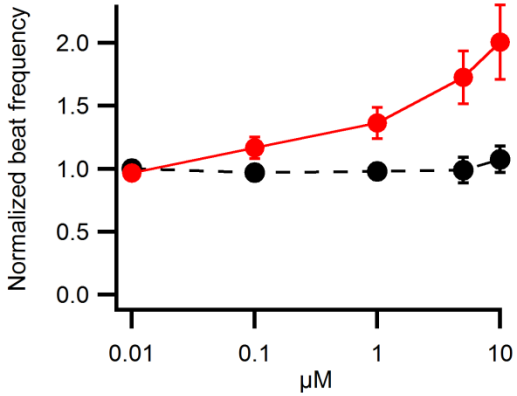
Carbachol
mACh agonist
Expected from lit. and detected:
Reduced beat rate (atrium), almost no effect in ventricle

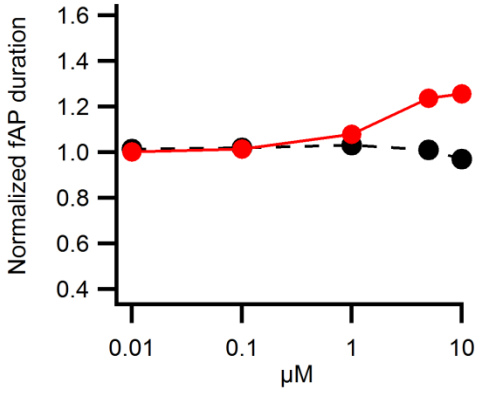
Red = atrium
Black = ventricle

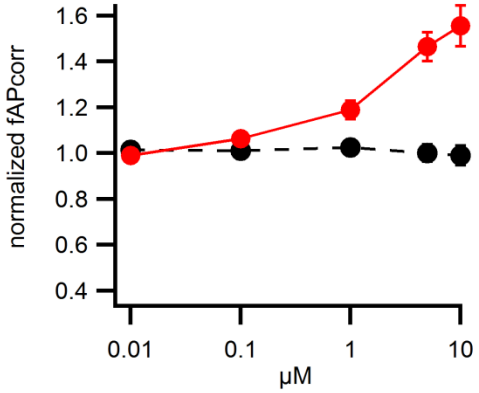
n =
atrium 6
ventricle 3-4

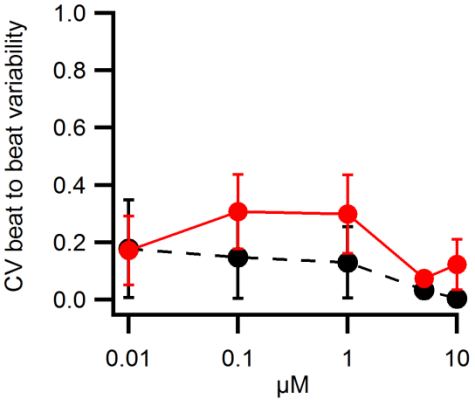
Compound application: DPO-1









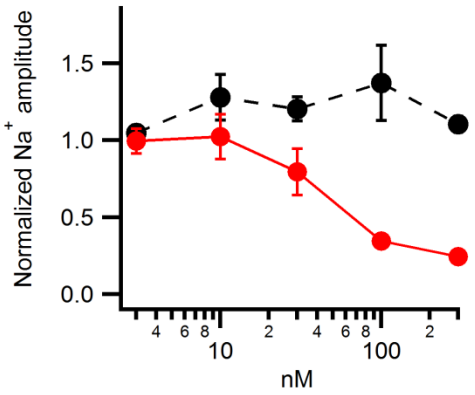


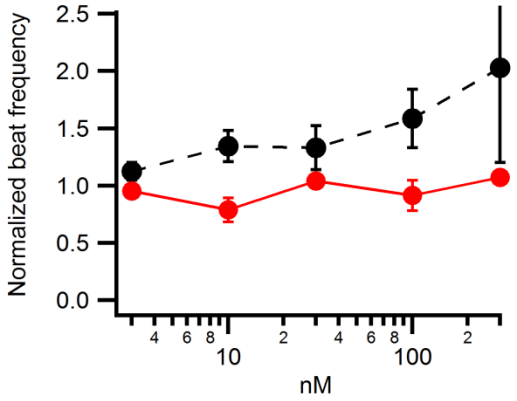
DPO-1
Kv 1.5 inhibitor
Expected from lit. and detected:
Atrium only; depolariation -> beat rate increase, fAP longer

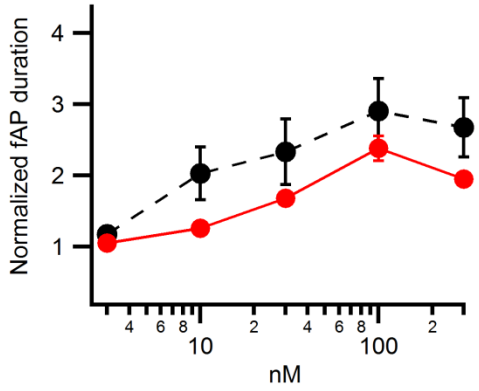
Red = atrium
Black = ventricle

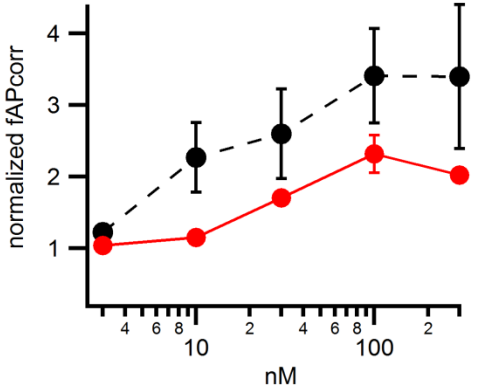
n =
atrium 9
ventricle 5

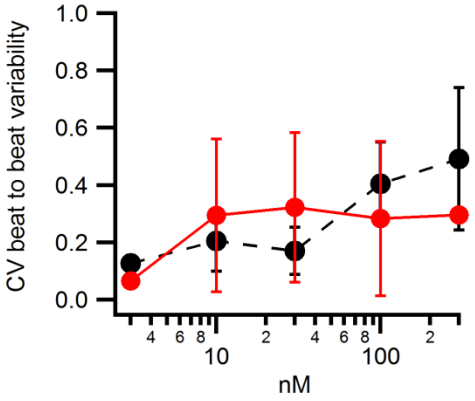
Compound application: E4031









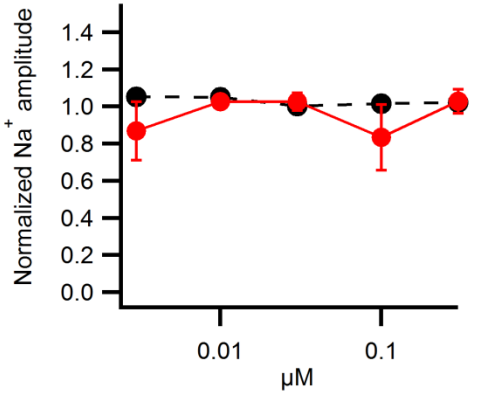


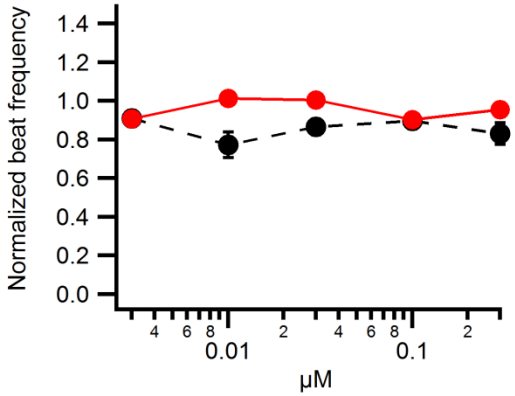
E4031
hERG inhibitor

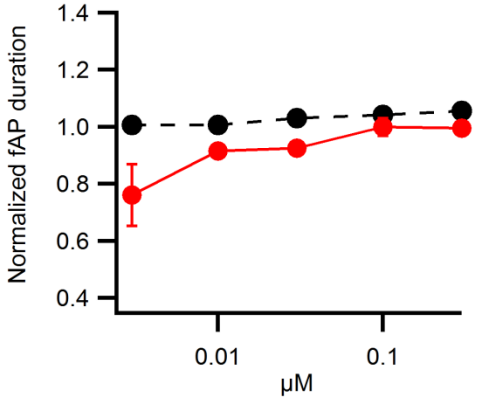
Red = atrium
Black = ventricle

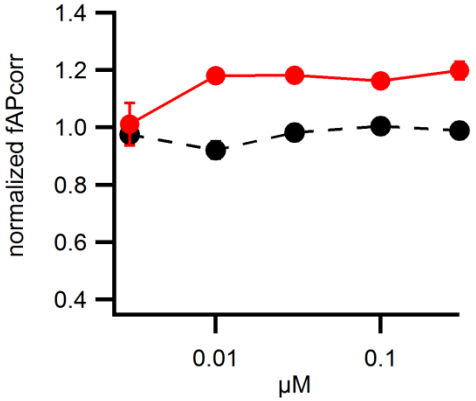
n =
atrium 2-5
ventricle 5

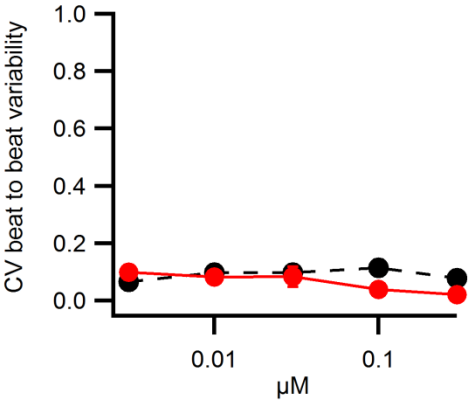
Compound application: Isoproterenol









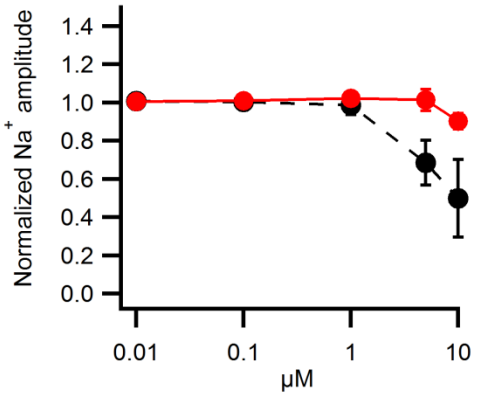


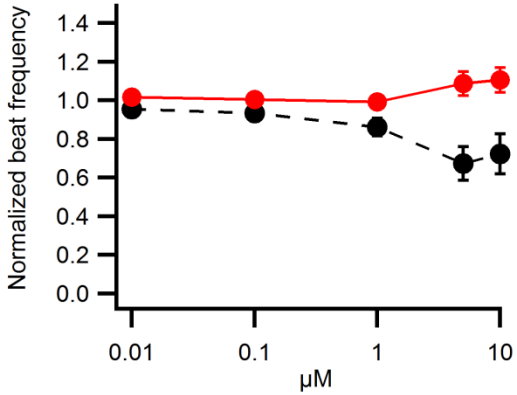
Isoproterenol/Isoprenaline
Beta-adrenergic agonist
Positive inotrop only,

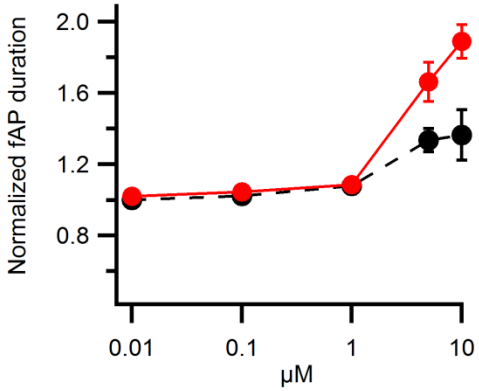
Red = atrium
Black = ventricle

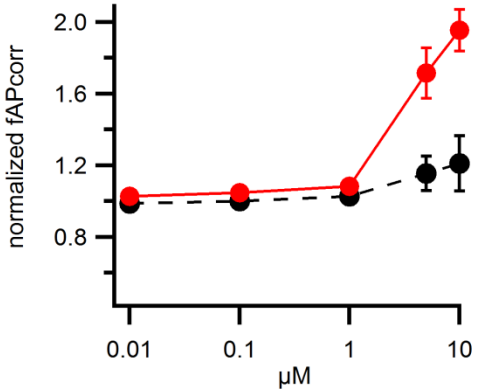
n =
atrium 6
ventricle 5

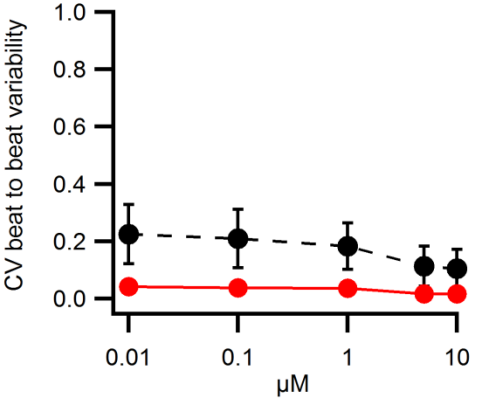
Compound application: Ivabradine











Ivabradine
If antagonist
Beat rate decrease

Red = atrium
Black = ventricle

n =
atrium 5
ventricle 4-7

Contact:

Dr. Udo Kraushaar
Group Leader Dept. of Electrophysiology
NMI Natural and Medical Sciences Institute
Markwiesenstrasse 55
72770 Reutlingen / Germany

udo.kraushaar@nmi.de
www.nmi.de