Find out more about the DPc10 and its derivatives

Publication title	How the Dcp10 peptide/derivative is used
Oxidation of ryanodine receptor (RyR) and calmodulin enhance Ca release and pathologically alter, RyR structure and calmodulin affinity. *J Mol Cell Cardiol*. 2015 Aug;85:240-8	The authors used fluorescent CaM, FKBP12.6, and a modified version of DPc10 to measure, directly in cardiac myocytes, (1) RyR2 activation by hydrogen peroxide (H2O2)-induced oxidation, (2) RyR2 conformation change caused by oxidation, (3) CaM-RyR2 and FK506-binding protein (FKBP12.6)-RyR2 interaction upon oxidation, and (4) whether dantrolene affects 1-3.
Binding of RyR2 "unzipping" peptide in cardiomyocytes activates RyR2 and reciprocally inhibits calmodulin binding *Circ Res*. 2013 Feb 1;112(3):487-97.	In this paper, the authors measure directly (in cardiac myocytes), the kinetics and binding affinity of DPc10 to RyR2, and how it affects RyR2 interaction with FKBP12.6 and CaM.
Catecholaminergic polymorphic ventricular tachycardia is caused by mutation-linked defective conformational regulation of the ryanodine receptor. *Circ Res*. 2010 Apr 30;106(8):1413-24.	In this study the authors used a knock-in (KI) mouse model with a human CPVT-associated RyR2 mutation (R2474S) to investigate the molecular mechanism by which CPVT is induced by a single point mutation within the RyR2. Dpc10 was used as the domain-unzipping peptide to reproduce abnormalities in the wild-type that were characteristic of the KI mice.
Defective regulation of the ryanodine receptor induces hypertrophy in cardiomyocytes. *Biochem Biophys Res Commun*. 2009 Mar 13;380(3):493-7	To determine if destabilization of the inter-domain interaction causes hypertrophy, the authors introduced DPc10 (which is known to destabilize the N-terminal/central domain interaction), into rat neonatal cardiomyocytes by mediation of peptide carrier BioPORTER.
Defective domain-domain interactions within the ryanodine receptor as a critical cause of diastolic Ca2+ leak in failing hearts. *Cardiovasc Res. 2009* Feb 15;81(3):536-45.	Using DPc10 and two other domain peptides harboring different mutation sites, the authors investigated the underlying mechanism of abnormal Ca(2+) cycling in failing hearts.
A domain peptide of the cardiac ryanodine receptor regulates channel sensitivity to luminal Ca2+ via cytoplasmic Ca2+ sites. *Eur Biophys J*. 2008 Apr;37(4):455-67	With Ca(2+) as the sole regulating ion, DPc10 caused increased channel activity which could be reversed by removal of the peptide, whereas in the presence of ATP DPc10 caused no activation. The results and the effects of DPc10 were explained entirely by perturbations in the cytoplasmic Ca(2+)-activation mechanism.
Scavenging free radicals by low-dose carvedilol prevents redox-dependent Ca2+ leak via stabilization of ryanodine receptor in heart failure. *J Am Coll Cardiol*. 2007 Apr 24;49(16):1722-32.	The authors investigated whether defective intracellular Ca2+ handling is corrected by carvedilol in heart failure. RyR was labelled with the fluorescent conformational probe methylcoumarin acetate (MCA) with DPc10 as a site-direction carrier.
The RyR2 central domain peptide DPc10 lowers the threshold for spontaneous Ca2+ release in permeabilized cardiomyocytes. *Cardiovasc Res*. 2006 Jun 1;70(3):475-85.	In this study, DPc10 was used as a tool to establish an adult cell model of the disease and to analyse the underlying mechanisms. The results suggested that the net effect of DPc10 (and CPVT mutations) on RyR2 function in situ is not only to increase the sensitivity to CICR as caffeine does, but also to potentiate Ca(2+) leakage from the SR.
Peptide probe study of the critical regulatory domain of the cardiac ryanodine receptor. *Biochem Biophys Res Commun*. 2002 Mar 8;291(4):1102-8.	The 'original' study, in which the authors demonstrate that Dcp10 enhances the ryanodine binding activity and increased the sensitivity of the RyR2 to activating Ca(2+): the effects that resemble the typical phenotypes of cardiac diseases.

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