

Ernst Bamberg
Publications 2006-2011

Bamann C, Gueta R, Kleinlogel S, Nagel G, **Bamberg E** (2010) Structural guidance of the photocycle of channelrhodopsin-2 by an interhelical hydrogen bond. *Biochemistry* 49:267-278

Bamann C, Kirsch T, Nagel G, **Bamberg E** (2008) Spectral characteristics of the photocycle of channelrhodopsin-2 and its implication for channel function. *J Mol Biol* 375:686-694

Bamann C, Nagel G, **Bamberg E** (2010) Microbial rhodopsins in the spotlight. *Curr Opin Neurobiol* 20:610-6

Caldwell JH, Herin GA, Nagel G, **Bamberg E**, Scheschonka A, Betz H (2008) Increases in intracellular calcium triggered by channelrhodopsin-2 potentiate the response of metabotropic glutamate receptor mGluR7. *J Biol Chem* 283:24300-24307

Carpaneto A, Koepsell H, **Bamberg E**, Hedrich R, Geiger D (2010) Sucrose- and H-dependent charge movements associated with the gating of sucrose transporter ZmSUT1. *PLoS One* 5:e12605

Dempski RE, Friedrich T, **Bamberg E** (2009) Voltage clamp fluorometry: Combining fluorescence and electrophysiological methods to examine the structure-function of the Na⁺/K⁺-ATPase. *BBA-Bioenergetics* 1787:714-720

Dempski RE, Hartung K, Friedrich T, **Bamberg E** (2006) Fluorometric measurements of intermolecular distances between the alpha- and beta-subunits of the Na⁺/K⁺-ATPase. *J Biol Chem* 281:36338-36346

Dempski RE, Lustig J, Friedrich T, **Bamberg E** (2008) Structural arrangement and conformational dynamics of the gamma subunit of the Na⁺/K⁺-ATPase. *Biochemistry* 47:257-266

Durr KL, Tavraz NN, Dempski RE, **Bamberg E**, Friedrich T (2009) Functional significance of E-2 state stabilization by specific alpha/beta-subunit interactions of Na, K- and H, K-ATPase. *J Biol Chem* 284:3842-3854

Durr KL, Tavraz NN, Zimmermann D, **Bamberg E**, Friedrich T (2008) Characterization of Na, K-ATPase and H, K-ATPase enzymes with glycosylation-deficient beta-subunit variants by voltage-clamp fluorometry in *Xenopus* oocytes. *Biochemistry* 47:4288-4297

Feldbauer K, Zimmermann D, Pintschovius V, Spitz J, Bamann C, **Bamberg E** (2009) Channelrhodopsin-2 is a leaky proton pump. *P Natl Acad Sci USA* 106:12317-12322

Geys SA, **Bamberg E**, Dempski RE (2009) Ligand-dependent effects on the conformational equilibrium of the Na⁺, K⁺-ATPase as monitored by voltage clamp fluorometry. *Biophys J* 96:4561-4570

Gorbunov D, Gorboulev V, Shatskaya N, Mueller T, **Bamberg E**, Friedrich T, Koepsell H (2008) High-affinity cation binding to organic cation transporter 1 induces movement of helix 11 and blocks transport after mutations in a modeled interaction domain between two helices. *Mol Pharmacol* 73:50-61

Haase A, Wood PG, Pintschovius V, **Bamberg E**, Hartung K (2007) Time resolved kinetics of the guinea pig Na-Ca exchanger (NCX1) expressed in *Xenopus* oocytes: voltage and Ca²⁺ dependence of pre-steady-state current investigated by photolytic Ca²⁺ concentration jumps. *Pflug Arch Eur J Phys* 454:1031-1042

Hänsel R, Foldynova-Trantirkova S, Lohr F, Buck J, Bongartz E, **Bamberg E**, Schwalbe H, Dötsch V, Trantirek L (2009) Evaluation of parameters critical for observing nucleic acids inside living *Xenopus laevis* oocytes by in-cell NMR spectroscopy. *J Am Chem Soc* 131:15761-15768

Hansel R, Lohr F, Foldynova-Trantirkova S, **Bamberg E**, Trantirek L, Dötsch V (2011) The parallel G-quadruplex structure of vertebrate telomeric repeat sequences is not the preferred folding topology under physiological conditions. *Nucleic Acids Res* 39:5768-5775

Hoffman J, Aslimovska L, Bamann C, Glaubitz C, **Bamberg E**, Brutschy B (2010) Studying the stoichiometries of membrane proteins by mass spectrometry: microbial rhodopsins and a potassium ion channel. *Phys Chem Chem Phys* 12:3480-3485

Hofmann B, Maybeck V, Eick S, Meffert S, Ingebrandt S, Wood P, **Bamberg E**, Offenhausser A (2010) Light induced stimulation and delay of cardiac activity. *Lab on a Chip* 10:2588-2596

Kalmbach R, Chizhov I, Schumacher MC, Friedrich T, **Bamberg E**, Engelhard M (2007) Functional cell-free synthesis of a seven helix membrane protein: In situ insertion of bacteriorhodopsin into liposomes. *J Mol Biol* 371:639-648

Kiesel M, Reuss R, Endter J, Zimmermann D, Zimmermann H, Shirakashi R, **Bamberg E**, Zimmermann U, Sukhorukov VL (2006) Swelling-activated pathways in human T-lymphocytes studied by cell volumetry and electrorotation. *Biophys J* 90:4720-4729

Kleinlogel S, Feldbauer K, Dempski RE, Fotis H, Wood PG, Bamann C, **Bamberg E** (2011) Ultra light-sensitive and fast neuronal activation with the Ca(2+)-permeable channelrhodopsin CatCh. *Nat Neurosci* 14:513-U152

Krieger F, Mourot A, Araoz R, Kotzyba-Hibert F, Molgo J, **Bamberg E**, Goeldner M (2008) Fluorescent agonists for the torpedo nicotinic acetylcholine receptor. *ChemBioChem* 9:1146-1153

Lorinczi E, Tsivkovskii R, Haase W, **Bamberg E**, Lutsenko S, Friedrich T (2008) Delivery of the Cu-transporting ATPase ATP7B to the plasma membrane in *Xenopus oocytes*. *BBA-Biomembranes* 1778:896-906

Lorinczi E, Verhoeven MK, Wachtveitl J, Woerner AC, Glaubitz C, Engelhard M, **Bamberg E**, Friedrich T (2009) Voltage- and pH-dependent changes in vectoriality of photocurrents mediated by wild-type and mutant proteorhodopsins upon expression in *Xenopus Oocytes*. *J Mol Biol* 393:320-341

Muller M, Bamann C, **Bamberg E**, Kühlbrandt W (2011) Projection structure of channelrhodopsin-2 at 6 Å resolution by electron crystallography. *J Mol Biol* 414:86-95

Nack M, Radu I, Bamann C, **Bamberg E**, Heberle J (2009) The retinal structure of channelrhodopsin-2 assessed by resonance Raman spectroscopy. *FEBS Lett* 583:3676-3680

Nack M, Radu I, Gossing M, Bamann C, **Bamberg E**, von Mollard GF, Heberle J (2010) The DC gate in Channelrhodopsin-2: crucial hydrogen bonding interaction between C128 and D156. *Photoch Photobio Sci* 9:194-198

Radu I, Bamann C, Nack M, Nagel G, **Bamberg E**, Heberle J (2009) Conformational changes of Channelrhodopsin-2. *J Am Chem Soc* 131:7313-7319

Ruffert K, Himmel B, Lall D, Bamann C, **Bamberg E**, Betz H, Eulenburg V (2011) Glutamate residue 90 in the predicted transmembrane domain 2 is crucial for cation flux through channelrhodopsin 2. *Biochem Biophys Res Co* 410:737-743

Schultheis C, Liewald JF, **Bamberg E**, Nagel G, Gottschalk A (2011) Optogenetic long-term manipulation of behavior and animal development. *PLoS One* 6:e18766

Sukhorukov VL, Endter JM, Zimmermann D, Shirakashi R, Fehrmann S, Kiesel M, Reuss R, Becker D, Hedrich R, **Bamberg E**, Roitsch T, Zimmermann U (2007) Mechanisms of electrically mediated cytosolic Ca²⁺ transients in Aequorin-Transformed tobacco cells. *Biophys J* 93:3324-3337

Tavraz NN, Friedrich T, Durr KL, Koenderink JB, **Bamberg E**, Freilinger T, Dichgans M (2008) Diverse functional consequences of mutations in the Na⁺/K⁺-ATPase alpha(2)-subunit causing familial hemiplegic migraine type 2. *J Biol Chem* 283:31097-31106

- Terpitz U, Raimunda D, Westhoff M, Sukhorukov VL, Beauge L, **Bamberg E**, Zimmermann D (2008) Electrofused giant protoplasts of *Saccharomyces cerevisiae* as a novel system for electrophysiological studies on membrane proteins. *BBA-Biomembranes* 1778:1493-1500
- Verhoeven MK, Bamann C, Blöcher R, Förster U, **Bamberg E**, Wachtveitl J (2010) The photocycle of channelrhodopsin-2: ultrafast reaction dynamics and subsequent reaction steps. *ChemPhysChem* 11:3113-3122
- Westhoff M, Reuss R, Zimmermann D, Netzer Y, Gessner A, Gessner P, Zimmermann G, Wegner LH, **Bamberg E**, Schwartz A, Zimmermann U (2009) A non-invasive probe for online-monitoring of turgor pressure changes under field conditions. *Plant Biol* 11:701-712
- Westhoff M, Schneider H, Zimmermann D, Mimietz S, Stinzing A, Wegner LH, Kaiser W, Krohne G, Shirley S, Jakob P, **Bamberg E**, Bentrup FW, Zimmermann U (2008) The mechanisms of refilling of xylem conduits and bleeding of tall birch during spring. *Plant Biol* 10:604-623
- Westhoff M, Zimmermann D, Schneider H, Wegner LH, Gessner P, Jakob P, **Bamberg E**, Shirley S, Bentrup FW, Zimmermann U (2009) Evidence for discontinuous water columns in the xylem conduit of tall birch trees. *Plant Biol* 11:307-327
- Yonehara K, Balint K, Noda M, Nagel G, **Bamberg E**, Roska B (2011) Spatially asymmetric reorganization of inhibition establishes a motion-sensitive circuit. *Nature* 469:407-410
- Zhang F, Wang LP, Brauner M, Liewald JF, Kay K, Watzke N, Wood PG, **Bamberg E**, Nagel G, Gottschalk A, Deisseroth K (2007) Multimodal fast optical interrogation of neural circuitry. *Nature* 446:633-639
- Zimmermann D, Kiesel M, Terpitz U, Zhou A, Reuss R, Kraus J, Schenk WA, **Bamberg E**, Sukhorukov VL (2008) A combined patch-clamp and electrorotation study of the voltage- and frequency-dependent membrane capacitance caused by structurally dissimilar lipophilic anions. *J Membr Biol* 221:107-121
- Zimmermann D, Reuss R, Westhoff M, Gessner P, Bauer W, **Bamberg E**, Bentrup FW, Zimmermann U (2008) A novel, non-invasive, online-monitoring, versatile and easy plant-based probe for measuring leaf water status. *J Exp Bot* 59:3157-3167
- Zimmermann D, Terpitz U, Zhou A, Reuss R, Müller K, Sukhorukov VL, Gessner P, Nagel G, Zimmermann U, **Bamberg E** (2006) Biophysical characterisation of electrofused giant HEK293-cells as a novel electrophysiological expression system. *Biochem Biophys Res Commun* 348:673-681
- Zimmermann D, Westhoff M, Zimmermann G, Gessner P, Gessner A, Wegner LH, Rokitta M, Ache P, Schneider H, Vasquez JA, Kruck W, Shirley S, Jakob P, Hedrich R, Bentrup FW, **Bamberg E**, Zimmermann U (2007) Foliar water supply of tall trees: evidence for mucilage-facilitated moisture uptake from the atmosphere and the impact on pressure bomb measurements. *Protoplasma* 232:10-34
- Zimmermann D, Zhou A, Kiesel M, Feldbauer K, Terpitz U, Haase W, Schneider-Hohendorf T, **Bamberg E**, Sukhorukov VL (2008) Effects on capacitance by overexpression of membrane proteins. *Biochem Biophys Res Commun* 369:1022-1026
- Zimmermann U, Ruger S, Shapira O, Westhoff M, Wegner LH, Reuss R, Gessner P, Zimmermann G, Israeli Y, Zhou A, Schwartz A, **Bamberg E**, Zimmermann D (2010) Effects of environmental parameters and irrigation on the turgor pressure of banana plants measured using the non-invasive, online monitoring leaf patch clamp pressure probe. *Plant Biol* 12:424-436