Publications related to Appendix 8

The following lists of citations are provided to the committee in response to the request that we received, asking for "all papers associated with" the currently active IACUC-approved VA research protocols with dogs. Some of these citations have already been provided to the committee in other contexts, but are included again here to show how they fit into the literature related to these protocols. The focus in these lists is on peer-reviewed full-length publications related to each of the protocols that were listed in Appendix 8 as approved for continuation as of March 28, 2018, and still open as of November 15, 2018. The most recent reports of research are usually in the form of abstracts that are published as summaries of results that are presented orally or in poster presentations at scientific conferences. Abstracts may also be peer-reviewed, but contain only summary information, so are not included here.

It is important to note that these lists cannot be considered complete, because the nature of scientific discovery is always to build on what has been learned and reported before, which in turn was built on what was learned and reported before that, so that the work done for each piece of the puzzle is "associated" with a large network of previous publications. And each publication stimulates new research to answer questions that arise from the new knowledge, so each piece of the puzzle will also become "associated" with a large network of future publications. The lists provided are also limited because of constraints on the time and resources available to assemble the lists, and must be recognized as only the results of our best efforts to date. Many publications have certainly been omitted, and those omissions should not be interpreted as signifying anything other than the limits of our efforts. Each of these citations represents another "piece of the puzzle" that the currently active research is designed to contribute to. Each publication also contains a list of further citations of relevant publications.

The current research may be very similar to the work reported in some of the publications cited here, involving the same models, and procedures, carried out by the same or different investigators, with or without VA support. Such publications show the value of the models used. The current research builds on the findings of such earlier work by (1) establishing how reproducible and representative of reality the earlier findings were, and then (2) expanding on those earlier findings or building on them to put in the next piece of the puzzle. Publications in this category may be thought of as puzzle pieces that the currently active research is designed to fit directly into.

The current research may also appear to be very different from the work reported in others of the publications cited, involving different models and procedures, carried out by different investigators focused on different parts of the larger puzzle. Such work may appear to be only indirectly or tangentially related to the current research, but is nonetheless part of the foundation on which the current work is built. Publications in this category may be thought of as puzzle pieces that are more distant from the focus of the current work, but are nonetheless essential for holding in place the pieces that the currently active research is designed to fit directly into.

Because rigorous biomedical research requires very careful definition of terms, closely drawn distinctions among similar concepts, and painstaking analysis and interpretation, it is important to take precautions against getting misled by similarities or differences in the titles of protocols and publications, which are intentionally simplified and cannot fully convey all of those detailed nuances. To recognize how each publication or protocol fits into the puzzle, it is necessary to read the full document closely.

Protocols that address different aspects of very similar topics (adjacent portions of the puzzle), such as the protocols at Richmond, must be based on similar background knowledge, so it is expected that there will be overlap among even the most recent and closely associated publications cited for each of these related protocols.

Explanatory notes are provided in italics.

Protocol Title: High Frequency Spinal Cord Stimulation to Restore Cough
VA Station: Cleveland
Status of research with dogs: approved, work with dogs is ongoing
(Citations are listed with the most recent publications first.)

1. Kowalski KE. Romaniuk JR, Kirkwood PA, and DiMarco AF. Inspiratory Muscle Activation via Ventral Lower Thoracic High Frequency Spinal Cord Stimulation. J Appl Physiol. PMID: 30763163 DOI: 10.1152/japplphysiol.01054.2018. Feb 14, 2019.

2. DiMarco AF, RT Geertman, K Tabbaa, KE Kowalski. Complete Restoration of Respiratory Muscle Function in Three Subjects with Spinal Cord Injury – Pilot Interventional Clinical Trial. Am J Phys Med Rehabil (2019) 98:43-50.
   This report documents the feasibility of using a mechanism developed through research with dogs, to restore expiratory function in human subjects with spinal cord injury. The current research is designed to improve on the mechanism reported here, by developing ways to use lower voltage that is applied more selectively, so as to minimize side effects.

3. Kirkwood PA, Romaniuk JR and Kowalski KE. Further observations on cardiac modulation of thoracic motoneuron discharges. Neurosci Lett. 2018 Nov 20. pii: S0304-3940(18)30813-9. doi: 10.1016/j.neulet.2018.11.026. PMID: 30468888.

4. Kowalski KE, JR Romaniuk, T Kowalski, AF DiMarco. Effects of expiratory muscle activation via high-frequency spinal cord stimulation. J Appl Physiol (2017) 123:1525-1531. PMID: 28935824

5. Romaniuk JR, Dick TE, Bruce EN, DiMarco AF, and Kowalski KE. Bifurcation of the Respiratory Response to Lung Inflation in Anesthetized Dogs. Respiratory Physiology & Neurobiology 244:26–31, 2017. PMCID: PMC5567807.

6. Kowalski KE, Kowalski T, DiMarco AF. Safety Assessment of Epidural Wire Electrodes for Cough Production in a Chronic Pig Model of Spinal Cord Injury. J Neurosci Methods 268:98-105, 2016. PMCID: PMC4903884.

7. Kowalski KE, JR Romaniuk, SW Brose, MA Richmond, T Kowalski, AF DiMarco. High frequency spinal cord stimulation – New method to restore cough. Respiratory Physiology & Neurobiology (2016) 232: 54-56. PMID: 27395446.

8. DiMarco AF, Kowalski KE. Electrical Activation to the Parasternal Intercostal Muscles during High Frequency Spinal Cord Stimulation in Dogs. J Appl Physiol 118:148-155, 2015. PMCID: PMC4297776.

9. DiMarco AF, Kowalski KE. Activation of inspiratory muscles via spinal cord stimulation. Respir Physiol Neurobiol 189:438-449, 2013. PMCID: PMC3812328.

10. DiMarco AF, Kowalski KE. Spinal pathways mediating phrenic activation during high frequency spinal cord stimulation. Respir Physiol Neurobiol 186:1-6, 2013. PMCID: PMC3602409.

11. DiMarco AF, Kowalski KE. Distribution of electrical activation to the external intercostal muscles during

high frequency spinal cord stimulation in dogs. J Physiol 589:1383-1395, 2011. PMCID: PMC3082098.

12. Kowalski KE, AF DiMarco. Comparison of wire and disc leads to activate the expiratory muscles in dogs. J Spinal Cord med (2011) 34:600-608. PMCID: PMC3237287.

13. DiMarco AF, Kowalski KE. Intercostal muscle pacing with high frequency spinal cord stimulation in dogs. Respir Physiol Neurobiol 171:218-224, 2010. PMCID: PMC2874655

14. DiMarco AF, Kowalski KE. High frequency spinal cord stimulation of inspiratory muscles in dogs: a new method of inspiratory muscle pacing. J Appl Physiol 107:662-669, 2009. PMCID: PMC4073921.

15. DiMarco AF, Romaniuk JR, Kowalski KE. Effects of diaphragm activation on airway pressure generation during lower thoracic spinal cord stimulation. Respir Physiol Neurobiol 159:102-107, 2007. PMID: 17681870.

16. Romaniuk JR, Dick TE, Kowalski KE, DiMarco AF. Effects of pulse lung inflation on chest wall expiratory motor activity. J Appl Physiol 102:485-491, 2007. PMID: 16959914.

17. DiMarco AF, KE Kowalski, G Supinski, JR Romaniuk. Mechanism of expiratory muscle activation during lower thoracic spinal cord stimulation. J Appl Physiology (2002) 92:2341-2346.

18. DiMarco AF, Kowalski KE, Supinski G, Romaniuk JR. Mechanism of expiratory muscle activation during lower thoracic spinal cord stimulation. J Appl Physiol. 92:2341-2346, 2002. PMID: 12015345.

19. DiMarco AF, Romaniuk JR, Supinski G, Kowalski KE. Effects of lung volume on parasternal pressure-generating capacity in dogs. Exp Physiol. 85:331-337, 2000. PMID: 10825421.

20. DiMarco AF, Romaniuk JR, Kowalski KE, Supinski G. Pattern of expiratory muscle activation during lower thoracic spinal cord stimulation. J Appl Physiol 86:1881-1889, 1999. PMID: 10368352.

21. DiMarco AF, Romaniuk JR, Kowalski KE, Supinski G. Mechanical contribution of expiratory muscles to pressure generation during spinal cord stimulation. J Appl Physiol 87:1433-1439, 1999. PMID: 10517775.

22. DiMarco AF, Romaniuk JR, Kowalski KE, Supinski GS. Efficacy of combined inspiratory intercostal and expiratory muscle pacing to maintain artificial ventilation. Am J Respir Crit Care Med 156:122-126, 1997. PMID: 9230735.

23. Romaniuk JR, Kowalski KE, Dick TE. The role of pulmonary stretch receptor activation during cough in dogs. Acta Neurobiol Exp (Wars) 57:21-29, 1997. PMID: 9407688.

24. DiMarco AF, Supinski GS, Kowalski KE, Romaniuk JR. Effects of pentobarbital anesthesia on intercostal muscle activation and shortening. J Appl Physiol 77:925-932, 1994. PMID: 8002549.

Protocol Title: Potentiation of Immunotherapy with Targeted Nanoporphyrin in Bladder Cancer
VA Station: Pleasant Hill
Status of research with dogs: approved, work with dogs has not yet started

This investigator was granted permission by the FDA to conduct components of this project than can be done with human subjects, and so has elected to focus on those aspects of the project at this time, leaving the work with dogs for later. Most medical advances are made not through a neatly unidirectional process, but as the result of many iterative cycles, to understand the underlying physiology and pathology, to develop methods of intervening to alter pathological development and to facilitate recovery of health (which often yields further insights into the underlying physiology and pathology, and informs further development of the interventions), and to refine those methods for safe clinical application (which often also yields further insights into the underlying physiology and pathology, and makes further refinement of the interventions possible). This means that it is unremarkable that some aspects of the research may be most appropriately conducted with human subjects, while other components yet to be carried out must still be done with dogs.

Protocol Title: Contribution of Inflammation and Oxidative Stress in Pericardial Fluid to Postoperative Atrial Fibrillation after Cardiac Surgery
VA Station: St. Louis
Status of research with dogs: approved, work with dogs has not yet started

The current gold standard for the surgical treatment of atrial fibrillation was based on extensive research that was all done with dogs, including that listed as accomplishment 25 in Appendix 6. The current protocol in Appendix 8 will continue this line of research, to more fully understand and manage atrial fibrillation. The list of publications provided below gives some idea of the many pieces of the puzzle that these investigators have put into place. (Citations are listed with the most recent publications first.)

The hemodynamic and atrial electrophysiologic consequences of chronic left atrial volume overload in a controllable **canine** model
Ruaengsri C, MR Schill, TS Lancaster, AJ Khiabani, JL Manghelli, DI Carter, JW Greenberg, SJ Melby, RB Schuessler, RJ Damiano Jr.
J Thorac Cardiovasc Surg (2018) 156:1871-1879.

Postoperative atrial fibrillation: The role of the inflammatory response.
Ishii Y, Schuessler RB, Gaynor SL, Hames K, **Damiano RJ** Jr.
J Thorac Cardiovasc Surg. 2017 Jun;153(6):1357-1365. doi: 10.1016/j.jtcvs.2016.12.051. Epub 2017 Feb 9.

Local transmural action potential gradients are absent in the isolated, intact dog heart but present in the corresponding coronary-perfused wedge.
Boukens BJ, Meijborg VMF, Belterman CN, Opthof T, Janse MJ, **Schuessler** RB, Coronel R, Efimov IR.
Physiol Rep. 2017 May;5(10). pii: e13251. doi: 10.14814/phy2.13251.

The Electrophysiologic Effects of Acute Mitral Regurgitation in a **Canine** Model.
Lawrance CP, Henn MC, Miller JR, Kopek MA, Zhang AJ, **Schuessler** RB, Damiano RJ Jr.
Ann Thorac Surg. 2017 Apr;103(4):1277-1284. doi: 10.1016/j.athoracsur.2016.08.011. Epub 2016 Oct 15.

Proteomic Profiling of Early Chronic Pulmonary Hypertension: Evidence for Both Adaptive and Maladaptive Pathology.
Aziz A, Lee AM, Ufere NN, **Damiano RJ**, Townsend RR, Moon MR.
J Pulm Respir Med. 2015;5(1). pii: 1000241

Multistage electrotherapy delivered through chronically-implanted leads terminates atrial fibrillation with lower energy than a single biphasic shock.
Janardhan AH, Gutbrod SR, Li W, Lang D, **Schuessler RB**, Efimov IR.
J Am Coll Cardiol. 2014 Jan 7-14;63(1):40-8. doi: 10.1016/j.jacc.2013.07.098. Epub 2013 Sep 26.

Heterogeneity and function of K(ATP) channels in **canine** hearts.
Zhang HX, Silva JR, Lin YW, Verbsky JW, Lee US, Kanter EM, Yamada KA, **Schuessler RB**, Nichols CG.
Heart Rhythm. 2013 Oct;10(10):1576-83. doi: 10.1016/j.hrthm.2013.07.020. Epub 2013 Jul 17.

Impact of differential right-to-left shunting on systemic perfusion in pulmonary arterial hypertension.

Weimar T, Watanabe Y, Kazui T, Lee US, Montecalvo A, **Schuessler RB**, Moon MR.
Catheter Cardiovasc Interv. 2013 Apr;81(5):888-95. doi: 10.1002/ccd.24458. Epub 2012 Nov 14.

A novel low-energy electrotherapy that terminates ventricular tachycardia with lower energy than a biphasic shock when antitachycardia pacing fails.
Janardhan AH, Li W, Fedorov VV, Yeung M, Wallendorf MJ, **Schuessler RB**, Efimov IR.
J Am Coll Cardiol. 2012 Dec 11;60(23):2393-8. doi: 10.1016/j.jacc.2012.08.1001. Epub 2012 Nov 7.

The effects of inflammation on heart rate and rhythm in a **canine** model of cardiac surgery.
Schuessler RB, Ishii Y, Khagi Y, Diabagate K, Boineau JP, Damiano RJ Jr.
Heart Rhythm. 2012 Mar;9(3):432-9. doi: 10.1016/j.hrthm.2011.09.074. Epub 2011 Oct 4.

Complex interactions between the sinoatrial node and atrium during reentrant arrhythmias in the **canine** heart.
Fedorov VV, Chang R, Glukhov AV, Kostecki G, Janks D, **Schuessler RB**, Efimov IR.
Circulation. 2010 Aug 24;122(8):782-9. doi: 10.1161/CIRCULATIONAHA.109.935288. Epub 2010 Aug 9.

Vagal denervation and reinnervation after ablation of ganglionated plexi.
Sakamoto S, **Schuessler RB**, Lee AM, Aziz A, Lall SC, Damiano RJ Jr.
J Thorac Cardiovasc Surg. 2010 Feb;139(2):444-52. doi: 10.1016/j.jtcvs.2009.04.056. Epub 2009 Sep 9.

Structural and functional evidence for discrete exit pathways that connect the **canine** sinoatrial node and atria.
Fedorov VV, **Schuessler RB**, Hemphill M, Ambrosi CM, Chang R, Voloshina AS, Brown K, Hucker WJ, Efimov IR.
Circ Res. 2009 Apr 10;104(7):915-23. doi: 10.1161/CIRCRESAHA.108.193193. Epub 2009 Feb 26.

Interatrial shunt for chronic pulmonary hypertension: differential impact of low-flow vs. high-flow shunting.
Zierer A, **Melby SJ**, Voeller RK, Moon MR.
Am J Physiol Heart Circ Physiol. 2009 Mar;296(3):H639-44. doi: 10.1152/ajpheart.00496.2008. Epub 2009 Jan 9.

Impact of calcium-channel blockers on right heart function in a controlled model of chronic pulmonary hypertension.
Zierer A, Voeller RK, **Melby SJ**, Steendijk P, Moon MR.
Eur J Anaesthesiol. 2009 Mar;26(3):253-9. doi: 10.1097/EJA.0b013e328324b631

Atrial fibrillation propagates through gaps in ablation lines: implications for ablative treatment of atrial fibrillation.
Melby SJ, Lee AM, Zierer A, Kaiser SP, Livhits MJ, Boineau JP, Schuessler RB, Damiano RJ Jr.
Heart Rhythm. 2008 Sep;5(9):1296-301. doi: 10.1016/j.hrthm.2008.06.009. Epub 2008 Jun 10.

Pulmonary vein isolation and the Cox maze procedure only partially denervate the atrium.
Lall SC, Foyil KV, Sakamoto S, Voeller RK, Boineau JP, Damiano RJ Jr, **Schuessler RB**.
J Thorac Cardiovasc Surg. 2008 Apr;135(4):894-900. doi: 10.1016/j.jtcvs.2007.11.044. Epub 2008 Mar 4.

Importance of geometry and refractory period in sustaining atrial fibrillation: testing the critical mass hypothesis.
Byrd GD, Prasad SM, Ripplinger CM, Cassilly TR, **Schuessler RB**, Boineau JP, Damiano RJ Jr.
Circulation. 2005 Aug 30;112(9 Suppl):I7-13.

Inflammation of atrium after cardiac surgery is associated with inhomogeneity of atrial conduction and atrial fibrillation.
Ishii Y, **Schuessler RB**, Gaynor SL, Yamada K, Fu AS, Boineau JP, Damiano RJ Jr.
Circulation. 2005 Jun 7;111(22):2881-8. Epub 2005 May 31.

Physiological consequences of bipolar radiofrequency energy on the atria and pulmonary veins: a chronic animal study.
Prasad SM, Maniar HS, Diodato MD, **Schuessler RB**, Damiano RJ Jr.
Ann Thorac Surg. 2003 Sep;76(3):836-41; discussion 841-2.

Cryoablation of ventricular tachycardia guided by return cycle mapping after entrainment.
Nitta T, Mitsuno M, Rokkas CK, Lee R, **Schuessler RB**, Boineau JP.
J Thorac Cardiovasc Surg. 2001 Feb;121(2):249-58.

Spatial distribution and frequency dependence of arrhythmogenic vagal effects in canine atria.
Sharifov OF, Zaitsev AV, Rosenshtraukh LV, Kaliadin AY, Beloshapko GG, Yushmanova AV, **Schuessler RB**, Boineau JP.
J Cardiovasc Electrophysiol. 2000 Sep;11(9):1029-42.

Effects of measurement error and sampling resolution on estimates of atrial tissue recovery parameters.
Kay MW, Bayly PV, **Schuessler RB**.
Ann Biomed Eng. 2000 Jun;28(6):677-90.

Use of the voice-controlled and computer-assisted surgical system ZEUS for endoscopic coronary artery bypass grafting.
Reichenspurner H, **Damiano RJ**, Mack M, Boehm DH, Gulbins H, Detter C, Meiser B, Ellgass R, Reichart B.
J Thorac Cardiovasc Surg. 1999 Jul;118(1):11-6.

The closed heart MAZE: a nonbypass surgical technique.
Lee R, Nitta T, **Schuessler RB**, Johnson DC, Boineau JP, Cox JL.
Ann Thorac Surg. 1999 Jun;67(6):1696-702.

Radial approach: a new concept in surgical treatment for atrial fibrillation. II. Electrophysiologic effects and atrial contribution to ventricular filling.
Nitta T, Lee R, Watanabe H, Harris KM, Erikson JM, **Schuessler RB**, Boineau JP, Cox JL.
Ann Thorac Surg. 1999 Jan;67(1):36-50.

Nontransmural laser treatment incompletely denervates canine myocardium.
Kwong KF, **Schuessler RB**, Kanellopoulos GK, Saffitz JE, Sundt TM 3rd.
Circulation. 1998 Nov 10;98(19 Suppl):II67-71; discussion II71-2.

A canine model of atrial flutter following the intra-atrial lateral tunnel Fontan operation.
Bromberg BI, **Schuessler RB**, Gandhi SK, Rodefeld MD, Boineau JP, Huddleston CB.
J Electrocardiol. 1998;30 Suppl:85-93.

Differential expression of gap junction proteins in the canine sinus node.
Kwong KF, **Schuessler RB**, Green KG, Laing JG, Beyer EC, Boineau JP, Saffitz JE.
Circ Res. 1998 Mar 23;82(5):604-12.

Return cycle mapping after entrainment of ventricular tachycardia.
Nitta T, **Schuessler RB**, Mitsuno M, Rokkas CK, Isobe F, Cronin CS, Cox JL, Boineau JP.
Circulation. 1998 Mar 31;97(12):1164-75.

Varying types of circus movement re-entry with both normal and dissociated contralateral conduction causing different right and left atrial rhythms in canine atrial flutter.
Yamauchi S, Boineau JP, **Schuessler RB**, Cox JL.
Jpn Circ J. 1998 Mar;62(3):201-10.

Transmyocardial laser treatment denervates canine myocardium.
Kwong KF, Kanellopoulos GK, Nickols JC, Pogwizd SM, Saffitz JE, **Schuessler RB**, Sundt TM 3rd.
J Thorac Cardiovasc Surg. 1997 Dec;114(6):883-9; discussion 889-90.

Spontaneous atrial flutter in a chronic canine model of the modified Fontan operation.
Gandhi SK, Bromberg BI, Rodefeld MD, **Schuessler RB**, Boineau JP, Cox JL, Huddleston CB.
J Am Coll Cardiol. 1997 Oct;30(4):1095-103.

Structural determinants of slow conduction in the canine sinus node.
Saffitz JE, Green KG, **Schuessler RB**.
J Cardiovasc Electrophysiol. 1997 Jul;8(7):738-44.

[Multielectrode mapping study of proarrhythmic vagal effects in the **dog** atria].
Zaítsev AV, Rozenshtraukh LV, Sharifov OF, Kaliadin AIu, **Schuessler RB**, Beloshapko GG, Iushmanova AV, Boineau JP.
Ross Fiziol Zh Im I M Sechenova. 1997 Mar;83(3):15-40. Russian.

Spatial coherence: a new method of quantifying myocardial electrical organization using multichannel epicardial electrograms.
Fendelander L, Hsia PW, **Damiano RJ** Jr.
J Electrocardiol. 1997 Jan;30(1):9-19.

Relationship between local atrial fibrillation interval and refractory period in the isolated canine atrium.
Kim KB, Rodefeld MD, **Schuessler RB**, Cox JL, Boineau JP.
Circulation. 1996 Dec 1;94(11):2961-7.

Improved nonthoracotomy defibrillation based on ventricular fibrillation waveform characteristics.
Hsia PW, Suresh G, Allen CA, Harrington G, Maskal S, Fain E, **Damiano RJ** Jr.
Pacing Clin Electrophysiol. 1996 Nov;19(11 Pt 1):1537-47.

Left-sided atrial flutter: characterization of a novel complication of pediatric lung transplantation in an acute canine model.
Gandhi SK, Bromberg BI, **Schuessler RB**, Boineau JP, Cox JL, Huddleston CB.
J Thorac Cardiovasc Surg. 1996 Oct;112(4):992-1001.

Anatomically based ablation of atrial flutter in an acute canine model of the modified Fontan operation.
Rodefeld MD, Gandhi SK, Huddleston CB, Turken BJ, **Schuessler RB**, Boineau JP, Cox JL, Bromberg BI.
J Thorac Cardiovasc Surg. 1996 Oct;112(4):898-907.

Characterization and surgical ablation of atrial flutter after the classic Fontan repair.
Gandhi SK, Bromberg BI, **Schuessler RB**, Turken BJ, Boineau JP, Cox JL, Huddleston CB.
Ann Thorac Surg. 1996 Jun;61(6):1666-78; discussion 1678-9.

Lateral tunnel suture line variation reduces atrial flutter after the modified Fontan operation.
Gandhi SK, Bromberg BI, Rodefeld MD, **Schuessler RB**, Boineau JP, Cox JL, Huddleston CB.
Ann Thorac Surg. 1996 May;61(5):1299-309.

A critical period of ventricular fibrillation more susceptible to defibrillation: real-time waveform analysis using a single ECG lead.
Hsia PW, Frerk S, Allen CA, Wise RM, Cohen NM, **Damiano RJ** Jr.
Pacing Clin Electrophysiol. 1996 Apr;19(4 Pt 1):418-30.

Atrial flutter after lateral tunnel construction in the modified Fontan operation: a canine model.
Rodefeld MD, Bromberg BI, **Schuessler RB**, Boineau JP, Cox JL, Huddleston CB.
J Thorac Cardiovasc Surg. 1996 Mar;111(3):514-26.

Defibrillation success is associated with myocardial organization. Spatial coherence as a new method of quantifying the electrical organization of the heart.
Hsia PW, Fendelander L, Harrington G, **Damiano RJ**.
J Electrocardiol. 1996;29 Suppl:189-97.

Relative densities of muscarinic cholinergic and beta-adrenergic receptors in the canine sinoatrial node and their relation to sites of pacemaker activity.
Beau SL, Hand DE, **Schuessler RB**, Bromberg BI, Kwon B, Boineau JP, Saffitz JE.
Circ Res. 1995 Nov;77(5):957-63.

Primary negativity does not predict dominant pacemaker location: implications for sinoatrial conduction.
Bromberg BI, Hand DE, **Schuessler RB**, Boineau JP.
Am J Physiol. 1995 Sep;269(3 Pt 2):H877-87.

Anterior septal coronary artery infarction in the canine: a model of ventricular tachycardia with a subendocardial origin. Ablation and activation sequence mapping.
Tweddell JS, Rokkas CK, Harada A, Pirolo JS, Branham BH, **Schuessler RB**, Boineau JP, Cox JL.
Circulation. 1994 Dec;90(6):2982-92.

Integration of absolute ventricular fibrillation voltage correlates with successful defibrillation.
Kuelz KW, Hsia PW, Wise RM, Mahmud R, **Damiano RJ** Jr.
IEEE Trans Biomed Eng. 1994 Aug;41(8):782-91.

Characterization and surgical ablation of acute atrial flutter following the Mustard procedure. A canine model.
Cronin CS, Nitta T, Mitsuno M, Isobe F, **Schuessler RB**, Boineau JP, Cox JL.
Circulation. 1993 Nov;88(5 Pt 2):II461-71.

Use of intraoperative mapping to optimize surgical ablation of atrial flutter.
Yamauchi S, **Schuessler RB**, Kawamoto T, Shuman TA, Boineau JP, Cox JL.
Ann Thorac Surg. 1993 Aug;56(2):337-42.

Simultaneous epicardial and endocardial activation sequence mapping in the isolated canine right atrium.
Schuessler RB, Kawamoto T, Hand DE, Mitsuno M, Bromberg BI, Cox JL, Boineau JP.
Circulation. 1993 Jul;88(1):250-63.

Lessons learned from computerized mapping of the atrium. Surgery for atrial fibrillation and atrial flutter.
Ferguson TB Jr, **Schuessler RB**, Hand DE, Boineau JP, Cox JL.
J Electrocardiol. 1993;26 Suppl:210-9.

Cholinergically mediated tachyarrhythmias induced by a single extrastimulus in the isolated canine right atrium.
Schuessler RB, Grayson TM, Bromberg BI, Cox JL, Boineau JP.
Circ Res. 1992 Nov;71(5):1254-67.

The effect of augmented atrial hypothermia on atrial refractory period, conduction, and atrial flutter/fibrillation in the canine heart.
Sato S, Yamauchi S, **Schuessler RB**, Boineau JP, Matsunaga Y, Cox JL.
J Thorac Cardiovasc Surg. 1992 Aug;104(2):297-306.

Significant left ventricular contribution to right ventricular systolic function.
Damiano RJ Jr, La Follette P Jr, Cox JL, Lowe JE, Santamore WP.
Am J Physiol. 1991 Nov;261(5 Pt 2):H1514-24.

Spontaneous tachyarrhythmias after cholinergic suppression in the isolated perfused canine right atrium.
Schuessler RB, Rosenshtraukh LV, Boineau JP, Bromberg BI, Cox JL.
Circ Res. 1991 Oct;69(4):1075-87.

Feasibility of closed heart discrete cryomodification of atrioventricular conduction. Electrophysiologic effects in the canine heart.
Yagi Y, **Schuessler RB**, Boineau JP, Cox JL.
J Thorac Cardiovasc Surg. 1991 Jun;101(6):1004-15.

The surgical treatment of atrial fibrillation. III. Development of a definitive surgical procedure.
Cox JL, **Schuessler RB**, D'Agostino HJ Jr, Stone CM, Chang BC, Cain ME, Corr PB, Boineau JP.
J Thorac Cardiovasc Surg. 1991 Apr;101(4):569-83.

The surgical treatment of atrial fibrillation. II. Intraoperative electrophysiologic mapping and description of the electrophysiologic basis of atrial flutter and atrial fibrillation.
Cox JL, Canavan TE, **Schuessler RB**, Cain ME, Lindsay BD, Stone C, Smith PK, Corr PB, Boineau JP.
J Thorac Cardiovasc Surg. 1991 Mar;101(3):406-26.

Functional consequences of the right ventricular isolation procedure.
Damiano RJ Jr, Asano T, Smith PK, Ferguson TB, Cox JL.
J Thorac Cardiovasc Surg. 1990 Oct;100(4):569-79.

Effect of neurotransmitters on the activation sequence of the isolated atrium.
Schuessler RB, Bromberg BI, Boineau JP.
Am J Physiol. 1990 Jun;258(6 Pt 2):H1632-41.

Left ventricular pressure effects on right ventricular pressure and volume outflow.
Damiano RJ Jr, Cox JL, Lowe JE, Santamore WP.
Cathet Cardiovasc Diagn. 1990 Apr;19(4):269-78.

Computerized potential distribution mapping: a new intraoperative mapping technique for ventricular tachycardia surgery.
Harada A, Tweddell JS, **Schuessler RB**, Branham BH, Boineau JP, Cox JL.
Ann Thorac Surg. 1990 Apr;49(4):649-55.

Effect of the right ventricular isolation procedure on ventricular vulnerability to fibrillation.
Damiano RJ Jr, Asano T, Smith PK, Cox JL.
J Am Coll Cardiol. 1990 Mar 1;15(3):730-6.

Biatrial isolation--a new surgical treatment for supraventricular tachycardia.
Harada A, D'Agostino HJ Jr, **Schuessler RB**, Boineau JP, Cox JL.
Jpn Circ J. 1990 Jan;54(1):100-8.

Interpolating unipolar epicardial potentials from electrodes separated by increasing distances.
Blanchard SM, **Damiano RJ** Jr, Smith WM, Ideker RE, Lowe JE.
Pacing Clin Electrophysiol. 1989 Dec;12(12):1938-55.

Pericardiocentesis guided by a pulse generator.
Tweddell JS, Zimmerman AN, Stone CM, Rokkas CK, **Schuessler RB**, Boineau JP, Cox JL.
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Boineau JP, **Schuessler RB**, Mooney CR, Wylds AC, Miller CB, Hudson RD, Borremans JM, Brockus CW.
Circulation. 1978 Dec;58(6):1036-48.

Protocol Title: Neuropharmacology of Pontine Control of Breathing Frequency
VA Station: Milwaukee
Status of research with dogs: approved, no further work with dogs is anticipated on this protocol as principal investigator has retired from VA, so work on this protocol is technically "inactive", but it is included here because the IACUC approval has not yet expired, and additional work with dogs could still be done if the ongoing analysis of the data collected from this protocol, and reviewer comments, require it.

The publications listed below were the result of work by Dr. EJ Zuperku and his colleagues. Most of the research is very basic in nature—characterizing mechanisms underlying the central control of breathing. The most recent studies involved the neurophysiology/pharmacology of the effects of volatile anesthetics and mu-opioids in producing respiratory depression. The studies in dogs made it possible to pin-point the anatomical region in the pons, where respiratory-related neurons are strongly depressed by clinically relevant concentrations of mu-opioids and cause severe slowing of breathing rate and complete arrest. Microinjection of naloxone into this small region reversed the respiratory rate depression. The reduction in tidal volume induced by opioids appears to occur by depression of neurons in the medulla. An understanding of the neurotransmitter/modulator properties of these opioid sensitive neurons will contribute to the development of therapeutic measures to counteract opioid-induced respiratory depression. (Citations are listed with the earliest publications first.)

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Protocol Title: Autonomic Nerve Activity and Cardiac Arrhythmias
VA Station: Richmond
Status of research with dogs: approved, work with dogs is ongoing

(Citations are listed with the most recent publications first.)

1. Larsen TR, Huizar JF, Tan AY. How pure is the honey? Distinguishing premature ventricular complex-induced from premature ventricular complex-worsened cardiomyopathy. Heart Rhythm. 2017 Dec;14(12):1871-1872. PMID: 28864213

2. Tan AY, Ellenbogen K. Ventricular Arrhythmias in Apparently Normal Hearts: Who Needs an Implantable Cardiac Defibrillator? Card Electrophysiol Clin. 2016 Sep;8(3):613-21. PMID: 27521094

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10. Jung B-C, Dave AS, **Tan AY**, Zhou S, Wang D, Akingba AG, Fishbein G, Montemagno C, Lin S-F, Chen LS, Chen P-S. Circadian Variations of Stellate Ganglion Nerve Activity in Ambulatory Dogs. Heart Rhythm 2006;3(1):78-85. PMID: 16399059.

Protocol Title: Effect of Chronic Premature Ventricular Contractions on the Remodeled Ischemic Heart
VA Station: Richmond
Status of research with dogs: approved, work with dogs is ongoing

(Citations are listed with the most recent publications first.)

1. Jiang M, et.al. JPH-2 Interacts with Ca_i-Handling Proteins and Ion Channels in Dyads: Contribution to Premature Ventricular Contraction-Induced Cardiomyopathy. Heart Rhythm 2016; 13(3): 743-52. PMID: 26538326.
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Protocol Title: Nanoparticle Injection into Ganglionated neural Plexi to Prevent Atrial Fibrillation
VA Station: Richmond
Status of research with dogs: approved, work with dogs is ongoing

(Citations are listed with the most recent publications first.)

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Protocol Title: A Comparison of Canine Anesthetic Regimens to Optimize Hemodynamic Stability and Quality of Electrophysiologic and Neurophysiologic Data Acquisition
VA Station: Richmond
Status of research with dogs: approved, work with dogs is ongoing

This protocol is designed to clarify how the various anesthetic regimens in use for dogs impact the hemodynamics, electrophysiology, and neurophysiology that are under study in protocols such as the other three IACUC-approved protocols being conducted in Richmond. Therefore, all of the publications listed for those three protocols are also relevant to this one. In addition, the published literature regarding the development of these anesthetic regimens, and understanding how they work and how they impact physiological systems, is also associated with this work.