Disciplina MCP5838
Tópicos Avançados sobre o Papel do Exercício Físico na Fisiopatologia Cardiovascular

Área de Concentração: 5131

Criação: 09/02/2023

Ativação: 30/05/2023

Nr. de Créditos: 2

Carga Horária:

Teórica (por semana)	Prática (por semana)	Estudos (por semana)	Duração	Total
6	5	4	2 semanas	30 horas

Docentes Responsáveis:

Carlos Eduardo Negrão

Maria Urbana Pinto Brandão Rondon

Objetivos:

Transmitir aos alunos conhecimentos avançados sobre as adaptações cardiovasculares associadas às mudanças moleculares, celulares e morfológicas provocadas pelo exercício físico; Desenvolver nos alunos uma visão crítica do papel do exercício nas doenças cardiovasculares; Proporcionar aos alunos um ambiente favorável para futuros estudos na área da cardiologia do exercício.

Justificativa:

Evidências acumuladas mostram que o exercício físico provoca adaptações marcantes no sistema cardiovascular. Mais recentemente, aprendemos que o exercício físico é uma importante conduta na prevenção e no tratamento das doenças cardiovasculares. Portanto, conhecer os benefícios do exercício físico no sistema cardiovascular e, sobretudo, o seu papel terapêutico são aprendizados de muita relevância. Nessa disciplina, os efeitos do exercício no sistema cardiovascular num contexto absolutamente translacional - da célula ao paciente - serão apresentados e profundamente discutidos. Ênfase será dada à hipertensão arterial, insuficiência coronariana e insuficiência cardíaca. Serão apresentados e discutidos, também, os efeitos do exercício no paciente oncológico que desenvolve doença cardiovascular em decorrência do tratamento do câncer ou mesmo do próprio câncer. Finalmente, com o objetivo de aproximar os aprendizados teóricos aos práticos serão ministradas aulas em laboratório sobre técnicas de avaliação de alguns conhecimentos adquiridos nas aulas teóricas.

Conteúdo:

Teórico: Hipertrofia fisiológica provocada pelo treinamento físico: Bases moleculares Limites fisiológicos das adaptações cardiovasculares em atletas Exercício físico no tratamento da hipertensão arterial: papel dos microRNAs Alterações autonômicas e hemodinâmicas na doença arterial coronariana: benefícios do exercício Exercício físico em pacientes com insuficiência cardíaca Exercício no paciente oncológico com doença cardiovascular Prático: Avaliação do tráfico nervoso simpático e circulação periférica no repouso e durante o exercício

Avaliação do fluxo sanguíneo periférico em repouso e durante o exercício Biópsia muscular em humanos

Forma de Avaliação:

Apresentação escrita e/ou oral de um projeto de pesquisa envolvendo as temáticas apresentadas no curso

Observação:

Número mínimo de alunos: 5 Número máximo de alunos: 20

Bibliografia:

BIBLIOGRAFIA: 1. Albini A, Pennesi G, Donatelli F, et al. Cardiotoxicity of anticancer drugs: The need for cardio- oncology and cardio-oncological prevention. J Natl Cancer Inst 102:14-25, 2010. 2. Alves CR, da Cunha TF, da Paixão NA, et al. Aerobic exercise training as therapy for cardiac and cancer cachexia. Life Sci 15;125C:9-14, 2015. 3. Alves CRR, Das Neves WS, De Almeida NR, et al. Exercise training reverses cancer-induced oxidative stress and decrease in muscle COPS2/TRIP15/ALIEN. Mol Metab. 35:101012, 2020. 4. Alves MJ, Rondon MU, Santos AC, et al. Sympathetic nerve activity restrains reflex vasodilatation in heart failure. Clin Auton Res 17(6):364-369, 2007. 5. Alves MJNN, dos Santos MR, Nobre TS, et al. Mechanisms of blunted muscle vasodilation during peripheral chemoreceptor stimulation in heart failure patients. Hypertension 60(3):669-76, 2012. 6. Antunes LM, Trevizan P, Bacurau AV, et al. Effects of aerobic and inspiratory training on skeletal muscle microRNA-1 and downstream-associated pathways in patients with heart failure. J. Cachex Sarcop Muscle. 11:89-102, 2019. 7. Antunes-Correa LM, Ueno-Pardi LM, Trevizan PF, et al. The influence of aetiology on the benefits of exercise training in patients with heart failure. Eur J Prev Cardiol 1:204748731668353, 2017. 8. Antunes-Correa LM, Nobre TS, Groehs RV, et al. Molecular basis for the improvement in muscle metaboreflex and mechanoreflex control in exercise-trained humans with chronic heart failure. Am J Physiol Heart Circ Physiol 307(11):H1655-66, 2014. 9. Antunes-Correa LM, Kanamura BY, Melo RC, et al. Exercise training improves neurovascular control and functional capacity in heart failure patients regardless of age. Eur J Prev Cardiol 19(4):822-9, 2012. 10. Antunes-Correa LM, Melo RC, Nobre TS, Ueno LM, et al. 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Correa LM, Groehs RV, et al. Exercise training improves neurovascular control and calcium cycling gene expression in heart failure patients with cardiac resynchronization therapy. Am J Physiol Heart Circ Physiol. 311:H1180-H1188, 2016. 82. Nobre T, Groehs R, Azevedo L, et al. Post-exercise neurovascular control in chronic heart failure patients. Int J Sports Med 37: 1073-1079, 2016. 83. Paula SM, Couto GK, Fontes MT, et al. Exercise training restores the myogenic response in skeletal muscle resistance arteries and corrects peripheral edema in rats with heart failure. Am J Physiol Heart Circ Physiol 317:87-96, 2019. 84. Phillips MI, Costales J, Lee RJ, et al. Antisense Therapy for Cardiovascular Diseases. Curr Pharm Des 21(30):4417-26, 2015. 85. Rolim NP, Medeiros A, Rosa KT, et al. Exercise training improves the net balance of cardiac Ca2+ handling protein expression in heart failure. Physiol Genomics 11;29(3):246-252, 2007. 86. Rondon E, Brasileiro-Santos MS, Moreira ED, et al. Exercise training improves aortic depressor nerve sensitivity in rats with ischemia-induced heart failure. Am J Physiol Heart Circ Physiol 291(6):H2801-H2806, 2006. 87. Rondon MU, Laterza MC, de Matos LD, et al. Abnormal muscle metaboreflex control of sympathetic activity in never-treated hypertensive subjects. Am J Hypertens 19(9):951-957, 2006. 88. Roveda F, Middlekauff HR, Rondon MU, et al. The effects of exercise training on sympathetic neural activation in advanced heart failure: a randomized controlled trial. J Am Coll Cardiol 42(5):854-860, 2003. 89. Sales ARK, Azevedo LF, Silva TOC, et al. High-intensity interval training decreases muscle sympathetic nerve activity and improves peripheral vascular function in patients with heart 90. Sales ARK, Negrao M, Testa L, Ferreira-Santos L, Groehs RRV, Carvalho B, Toschi-Dias E, Rocha NG, Laurindo F, Debbas V, Rondon MUPB, Mano M, Hajjar LA, Hoff P, Filho R, Negrão CE. Chemotherapy acutely impairs neurovascular and hemodynamic responses in women with breast cancer. Am J Physiol Heart Circ Physiol 317: H1-H12, 2019. 91. Santos AC, Alves MJ, Rondon MU, et al. Sympathetic activation restrains endothelium-mediated muscle vasodilatation in heart failure patients. Am J Physiol Heart Circ Physiol 289(2):H593-599, 2005. 92. Santos JM, Kowatsch I, Tsutsui JM, et al. Effects of exercise training on myocardial blood flow reserve in patients with heart failure and left ventricular systolic dysfunction. Am J Cardiol 15;105(2): 243-8, 2010. 93. Schneider CM, Hsieh CC, Sprod LK, et al. Effects of supervised exercise training on cardiopulmonary function and fatigue in breast cancer survivors during and after treatment. Cancer 110:918-925, 2007. 94. Scott JM, Khakoo A, Mackey JR, et al. Modulation of anthracycline-induced cardiotoxicity by aerobic exercise in breast cancer: Current evidence and underlying mechanisms. Circulation 124:642-650, 2011. 95. Soares-Miranda L, Franco FG, Roveda F, et al. Effects of exercise training on neurovascular responses during handgrip exercise in heart failure patients. Int J Cardiol 146(1):122-5, 2011. 96. Soci UP, Fernandes T, Hashimoto NY, et al. MicroRNAs 29 are involved in the improvement of ventricular compliance promoted by aerobic exercise training in rats. Physiol Genomics 15;43(11): 665-73,2011. 97. Tanaka LY, Bechara LRG, dos Santos AM, et al. Exercise improves endothelial function: A local analysis of production of nitric oxide and reactive oxygen species. Nitric Oxide 45:7–14, 2015. 98. Toschi-Dias E, Rondon MUPB, Cogliati C, et al. Contribution of Autonomic Reflexes to the Hyperadrenergic State in Heart Failure. Front Neurosci. 11:162, 2017. 99. Ueno LM, Drager LF, Rodrigues AC, et al. Day-night pattern of autonomic nervous system modulation in patients with heart failure with and without sleep apnea. Int J Cardiol 148(1): 53- 8, 2011 100. Voltarelli VA, Bechara LR, Bacurau AV, et al. Lack of β2-adrenoceptors aggravates heart failure- induced skeletal muscle myopathy in mice. J Cell Mol Med 18(6):1087-1097, 2014. 101. Wilson MG, Ellison GM, Cable NT. Basic science behind the cardiovascular benefits of exercise. Heart. 101:758-765, 2015. 102. Zucker IH, Patel KP, Schultz HD, et al. Exercise training and sympathetic regulation in experimental heart failure. Exerc Sport Sci Rev 32:107-111, 2004.

Idiomas ministrados:

Português

Tipo de oferecimento da disciplina:

Não-Presencial

Informações adicionais do oferecimento da disciplina:

A porcentagem da disciplina que ocorrerá no sistema não presencial (1- 100%). 65% da disciplina ocorrerá no formato remoto 35% da disciplina ocorrerá no formato presencial Detalhamento das atividades que serão presenciais e das que serão desenvolvidas via remota, com discriminação do tempo de atividade contínua online. Atividades presenciais: As aulas práticas previstas no programa da disciplina ocorrerão no formato presencial, no Laboratório de Pesquisa da Unidade de Reabilitação Cardiovascular e Fisiologia do Exercício do Instituto do Coração do HC-FMUSP. Atividades remotas: As aulas teóricas previstas no programa da disciplina ocorrerão no formato remoto, em blocos de 60 a 90 minutos por tema abordado, perfazendo um total de 4 horas por dia de aula ministrada, com intervalos de 10 a 15 minutos entre as aulas. Especificação se as aulas, quando online, serão síncronas ou assíncronas. As aulas ministradas online serão síncronas, sempre com a presença de pelo menos um dos responsáveis pela disciplina. Descrição do tipo de material e/ou conteúdo que será disponibilizado para o aluno e a A plataforma que será utilizada. O cronograma das aulas, artigos referentes às aulas e um resumo dos slides apresentados nas aulas ministradas (PDF) serão disponibilizados para os alunos via Plataforma Moodle – E-disciplinas USP Definição sobre a presença na Universidade e, quando necessária, discriminar quem deverá estar presente (professora/professor; aluna/aluno; ambos). As atividades presenciais serão desenvolvidas com a presença dos professores responsáveis pela disciplina e dos alunos matriculados Descrição dos tipos e da frequência de interação entre aluna/aluno e professora/professor (somente durante as aulas; fora do período das aulas; horários; por chat/e-mail/fóruns ou outro). A interação entre aluno e professores se dará durante as aulas teóricas remotas e durante as aulas práticas presenciais. Quando necessário, será disponibilizado o contato via e-mail dos professores ou a realização de conversa via Google Meet, para esclarecimentos de dúvidas. A forma de controle da frequência nas aulas. A frequência às aulas remotas se dará pela assinatura dos alunos em chat do Google Meet e pelo relatório enviado pelo sistema ao coordenador da aula (docente responsável pela disciplina) constando o horário de entrada e saída no Meet, de cada aluno. Nas aulas presenciais o controle de frequência se dará pela assinatura da lista de frequência disponibilizada pelos professores. Informação sobre a obrigatoriedade ou não de disponibilidade de câmera e áudio (microfone) por parte dos alunos. Os alunos necessitarão dispor de câmera e microfone para participação nas aulas remotas, através de celular, tablet ou computador. A forma de avaliação da aprendizagem (presencial/remota). Ao final do curso os alunos idealizarão um projeto de pesquisa, que deverá ser elaborado a partir dos conhecimentos transmitidos nas aulas teóricas e práticas ministradas.