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Disc4All_2020: Training network to advance integrated computational simulations in translational medicine, applied to intervertebral disc degeneration

Description

The European community requires early stage researchers (ESRs) who can work across the boundaries of traditional disciplines, integrating experimental and in silico approaches to understand and manage complex multifactorial disorders. This training network utilises intervertebral disc degeneration (LDD) leading to low back pain (LBP) as a relevant application for data integration and computational simulations in translational medicine. LBP is the largest cause of morbidity worldwide, yet there remains controversy as to the specific cause leading to poor treatment options and prognosis. LDD is reported to account for 50% of LBP in young adults, but the interplay of factors from genetics, environmental, cellular responses and social and psychological factors is poorly understood. Unfortunately, the integration of such data into a holistic and rational map of degenerative processes and risk factors has not been achieved, requiring creation of professional crosscompetencies, which current training programmes fail to address. Disc4All aims to tackle this issue through collaborative expertise of clinicians; computational physicists and biologists; geneticists; computer scientists; cell and molecular biologists; microbiologists; bioinformaticians; and industrial partners. It provides interdisciplinary training in data curation and integration; experimental and theoretical/computational modelling; computer algorithm development; tool generation; and model and simulation platforms to transparently integrate primary data for enhanced clinical interpretations through models and simulations. Complementary training is offered in dissemination; project management; research integrity; ethics; regulation; policy; business strategy; and public and patient engagement. The Disc4All ESRs will provide a new generation of internationally mobile professionals with unique skill sets for the development of thriving careers in translational research applied to multifactorial disorders.

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Source URL (retrieved on 19 mai 2024 - 16:38): <https://www.bsc.es/ca/research-and-development/projects/disc4all2020-training-network-advance-integrated-computational>