



European FP7 research project on intervertebral disc degeneration and associated pathologies

Objective

The overall aim of Genodisc is to improve treatment of pathologies linked to degeneration of the intervertebral disc by developing clearer objective diagnostic criteria. It aims to Improve Diagnosis by identifying and developing protocols for selecting populations suitable for investigating disc degeneration and its associated disorders, using bioinformatic and modelling analyses to aid development of clear diagnostic tools such as biomarkers and imaging parameter, assessing repair possibilities using new diagnostic criteria. It also focuses on prevention, trying identifying genes associated with disc-degeneration linked pathologies by full genome screens of carefully chosen patient populations and uncovering pathological pathways by examining, experimentally, specific pathways that could alter functioning of the intervertebral disc and its cells. Finally, it aims to Enhance the Possibility of Repair by learning through modelling by using computer and experimental modelling to show how the function of the tissue matrix and spinal units will alter with disease and by developing strategies for repair by genotyping and careful diagnosis and assessment of patients.

State of the art

Disorders arising from degeneration of the intervertebral disc are an enormous clinical and financial burden on European societies. At present, 85% of patients have no clear diagnosis resulting in arbitrary treatments, usually surgical, which range widely from centre to centre and are often ineffective. Disc degeneration is known to be highly genetically linked and several potential candidate genes have been identified but the findings have not been replicated between studies. More importantly, of the polymorphisms studied each has only modest effects: it is likely that degeneration involves multiple, interacting genetic and environmental determinants.

Disc degeneration is often asymptomatic. A significant proportion of the population has degenerated and even prolapsed discs but remains free of pain and symptoms and it's unclear what is the cause of such difference. Better diagnosis of acute conditions would permit early intervention on the ones who suffers from pain. Moreover, diagnostic criteria that could predict whether acute conditions associated with disc degeneration will become chronic could help to prevent the development of chronicity.

In order for physiological 'repair' to be feasible, the intrinsic structure of the disc and the neighbouring tissues need to be viable. It is important to ascertain if certain disorders can be targeted by different therapies and also to determine which patients will benefit from biological therapy.

Activities

The project activities are organised in eleven workpackages, divided into 5 years, which concentrate on different aspects of the study: recruit study cohort and collect data on phenotypes, try to identify genes correlated with different pathologies, delineate pathways which upregulate disc matrix degradation, search for target genes or serum markers for understanding pathogenesis and for diagnostic purposes.

Moreover, during the project, the various partners will develop models for disc degeneration, useful for treatment and diagnosis, and novel diagnostic methods for specific spinal pathologies, useful for targeting and identification of prevention strategies.

Project partners

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