

Improving assessment of arthritis models to better reflect human symptoms of disease

Rheumatoid Arthritis (RA) is a common inflammatory disease that is characterized by swelling and tenderness of multiple joints. The resulting pain and joint stiffness cause disability for patients and treatment to control the inflammation is required to manage the disease and prevent it from getting worse.

RA occurs when the immune system mistakenly attacks the body's own tissues. There is currently no cure for this disease and there is a lot of variability in whether patients will respond well to the currently available therapies. For many patients, RA results in disability and a deterioration in quality of life.

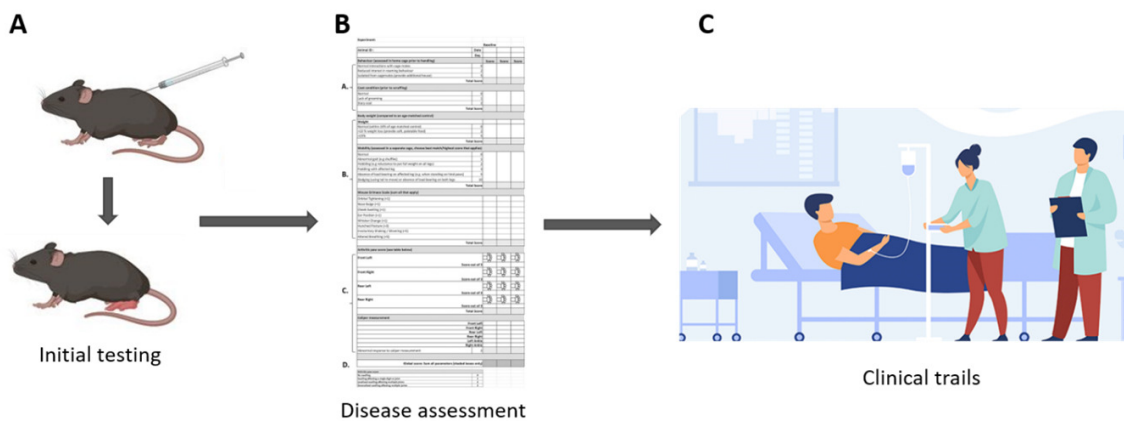


Fig. 1. Drug development and subsequent progression to clinical trials. After an initial screening of a drug in the lab, (A) animal models are generated that represent the human rheumatoid arthritis and the drug is then tested in these models. (B) A comprehensive scoring sheet has been developed that captures the symptoms of the disease accurately to record the effectiveness of the medicine. (C) Medicines that prove to be effective are then tested in human clinical trials.

Currently mouse models of arthritis are used to design and test new medicines because mice are biologically very similar to humans. Researchers have successfully generated mice with arthritis that carry similar disease-causing factors to those of humans with arthritis. Choosing the right animal model that accurately represents arthritis development and symptoms is an essential step for testing medicines before they can be tested in human clinical trials (Fig. 1).

Rheumatologists have developed detailed scoring systems that record various parameters of a patient's disease severity, such as the number of swollen joints and tender joints and response to therapy. These scoring systems are used routinely in clinics and in clinical trials of new medicines to assess how well new treatments work in humans. However, for animal models there is no such universal data collection system to consistently assess arthritis. Without a clear and standardized data collection system, it is difficult to compare different medicines to identify the most effective ones, hence there are variations and inconsistencies/conflicts in the findings reported by research groups that may be due to different approaches in collecting the data.

Most of the scoring systems that are used in different research laboratories capture the number of inflamed joints, but they fail to record the changes in behavior that occur in animals experiencing joint stiffness or fatigue – these are two of the aspects of the disease that patients report as the most problematic for their day-to-day lives and are therefore important aspects of the disease where treatments need to be effective. To address this, we have developed detailed scoring sheets similar to those used in clinical practice, which cover various disease parameters (Chiamaka, 2022). Our scoring system does not require any specialist equipment. It allows us to look at the sum of all the measured parameters that give us an overview of the effect of the disease on the whole animal, rather than focusing purely on the swollen/inflamed joints.

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