Stretching is one of the most common physical interventions that are broadly recognized to be suitable for pre-conditioning to minimize injury risks as well as for post-conditioning to subside exercise-induced tissue damages and fatigue. However, the molecular mechanism behind the beneficial effects of stretching is poorly understood. It is not even clear if the effects of muscle stretching really originate from the muscle stretched, given that most of the stretching procedures stretch non-muscle tissues as well. Furthermore, stretching, with no exception, is followed by relaxation, which often has biological implications opposite of stretching. Therefore, apparent stretching effects may actually result from relaxation rather than stretching itself.

Here, I review our and others’ previous findings on effects and implications of stretching at cellular and molecular levels, and discuss the possibility of stretching as an anti-ageing intervention. From a mechanobiological point of view, I speculate that the essence of stretching to combat ageing or inflammation lies in relaxation of cells and molecules.