

Tumours can use 'remote control' to attract blood vessels

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Researchers at Leiden University have demonstrated that tumours can apply mechanical means to attract the blood vessels they need to be able to grow. The team published this discovery on 2 March in *Nature Scientific Reports*.

Tumour growth

Tumours secrete soluble factors to stimulate [blood vessels](#) to grow

towards them, a process known as 'tumour angiogenesis'. This enables the tumour to grow and at the same time allows [cells](#) to escape into the blood stream and colonise distant organs. Drugs are currently in use to block this process. Leiden researchers have discovered that tumours can also attract blood vessels by a completely different, mechanical means.

Cutting the cables prevents reaction of blood vessels

The team, led by Dr Erik Danen, printed clusters of [tumour cells](#) in a protein meshwork that mimics the typical surroundings of a tumour in the body. They discovered that the 'mini tumours' can pull on the meshwork and reorganise it surprisingly far from the tumour border. Blood vessel cells that were placed in the vicinity of the meshwork recognized the changes in the meshwork and responded by crawling towards the tumour. The researchers were able to prevent the reaction of the blood vessels by cutting the cables in the meshwork using a laser. The forces exerted by a tumour on the environment can thus act as a 'remote control' to steer angiogenesis.

Broader research on mechanical forces in biology

This finding matches a series of recent studies that show that mechanical forces play a remarkably important role in biology and in disease processes. All kinds of cell types appear to be able to reshape their environment mechanically, and stem cells respond to such changes by differentiating towards nerve, muscle or bone cells. How cells are able to apply forces and how this regulates normal physiology and disease is the theme of an international conference being organised by Dr Danen and Professor Thomas Schmidt (also from Leiden University) on 22 March in the KNAW Trippenhuis building in Amsterdam.

More information: Hayri E. Balcioglu et al. Tumor-induced remote

ECM network orientation steers angiogenesis, *Scientific Reports* (2016).
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Provided by Leiden University

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