

How a bad night's sleep might worsen cancer development

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Recent studies have indicated that patients with sleep apnea may be associated with worse cancer outcomes. Now a new animal study, presented at the European Association of Urology Congress in Munich, uncovers a possible mechanism which may underlie this link.

Hypoxia is where a tissue or organ does not get enough oxygen. It is one of the consequences of sleep apnea, which is a common disorder in which you have one or more pauses in breathing or shallow breaths while you sleep. Sleep apnea has been associated with increases in the risk of several conditions, such as [high blood pressure](#) or stroke. Recently some evidence has also linked it to worse cancer outcomes, although there is some conflicting evidence on this. The possible mechanism linking apnea to worse outcomes is not known, although it is known that patients suffering from obstructive apnea usually suffer from intermittent hypoxia.

Now a group of Spanish-US researchers have used a mouse model to show that intermittent hypoxia promotes the formation of blood vessels within tumours, probably due to an increased production of Vascular endothelial growth factor (VEGF). VEGF is known to promote blood vessels formation.

A team led by Dr Antoni Vilaseca (Hospital Clínic De Barcelona, Spain) took 12 experimental and 12 control mice with kidney tumours and subjected them to varying oxygen levels to mimic intermittent hypoxia. They found that the mice which had been subjected to intermittent

hypoxia showed increases in vascular progenitor cells ($6,1 \pm 0,76$ vs $4,5 \pm 1,1$; $p=0,001$) and endothelial cells ($4 \pm 0,8$ vs $2,5 \pm 1$; $p=0,013$) within the tumors; these cells may later mature to form blood vessels in the tumors. Circulating VEGF was also increased in the mice which had undergone hypoxia (306 ± 93 vs 204 ± 45 pg/mL; $p=0,001$), although other factors such as tumour growth, were not affected.

Lead researcher Dr Vilaseca said:

"Patients suffering from [obstructive sleep apnea](#) usually suffer from intermittent hypoxia at night. This work shows that [intermittent hypoxia](#) has the potential to promote the formation of [blood vessels](#) within tumours, meaning that the tumours have access to more nutrients".

He continued:

"This is of course an early animal study, so we need to be cautious in applying this to humans. Nevertheless, this work indicates a plausible mechanism for just why conditions which restrict oxygen flow to tissues, like [sleep apnea](#), may promote cancers".

Commenting, Professor Arnulf Stenzl (Tübingen), Chair of the EAU Congress Committee, said:

"Although this is an experimental study, it is remarkable, because it demonstrates the influence of oxygen deficiency on the growth of [renal cell carcinoma](#) tissue (both primary tumour as well as metastases). It may be postulated that increased oxygenation of the blood may be the underlying mechanism why not smoking or giving up smoking, regular sport activity (especially endurance type sports), reducing the body mass index and other life style changes that increase tissue oxygenation have a supportive beneficial effect on better outcomes in renal cell cancer as well as other tumour types".

Provided by European Association of Urology

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