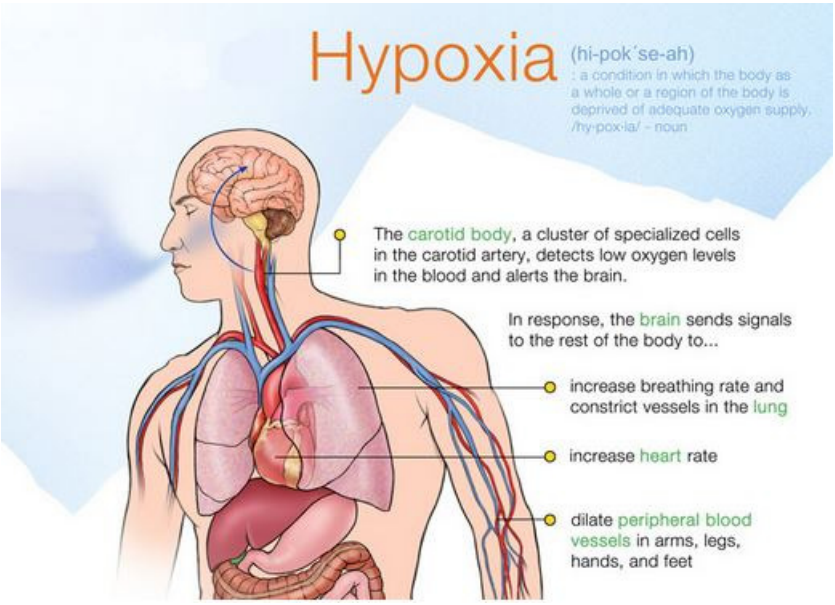
Hypoxia is lack of Oxygen

Masks cause lack of Oxygen

Hypoxia is a condition in which the body or a region of the body is deprived of adequate oxygen supply at the tissue level. Hypoxia may be classified as either generalized, affecting the whole body, or local, affecting a region of the body.

https://foods4.org/hypoxia-lack-of-oxygen

Ask for links to the studies!



What is the first sign of hypoxia?

Early signs of hypoxia are anxiety, confusion, and restlessness; if hypoxia is not corrected, hypotension will develop. As hypoxia worsens, the patient's vital signs, activity tolerance, and level of consciousness will de-

Hypoxia affects many aspects of metastatic disease, including cell proliferation, metabolic capacity, immune response, and resistance to chemotherapeutic intervention. At the cellular level, hypoxic responses are mediated by hypoxia-inducible (HIF) transcription factors, which regulate gene expression driving the adaptation of resident cells.

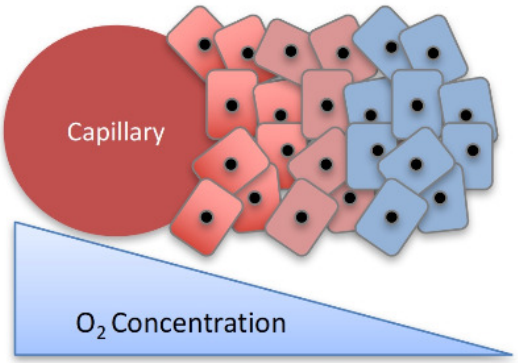
The hypoxic tumor microenvironment. Solid tumors rapidly outgrow their blood supply, leaving tumor regions with oxygen concentrations significantly lower than those found in healthy tissues. Hypoxic conditions lead to cancer cells with increased mutation rates, drug-efflux, and evasion of apoptosis, as well as decreased overall cell proliferation, drug solubility, and secretion of soluble cytokines and nutrients.

Hypoxic cancer cells are typically more resistant to apoptosis and chemotherapy, enabling metastasis and aggressive malignant phenotypes. A hypoxic microenvironment devoid of nutrients prevents the cell from undergoing energy dependent apoptosis and cells become necrotic.

Cancer Thrives in hypoxic environment!
Cancer is harder to treat when exposed to hypoxia!

Hypoxia in the Tumor Microenvironment

Normoxic Cancer Cells
- Near blood vessel (1)
- Low HIF1-alpha expression (2)
- More susceptible to chemotherapy and radiation therapy (1)



Hypoxic Cancer Cells:
- Increased genetic instability (3)
- Poor immune response (2)
- Influence ECM Remodeling/Stiffness (2)
- HIF1-alpha expression results in altered angiogenesis (2,3)
- Less susceptible to chemotherapy and radiation therapy (1,3)

Hypoxia is essential for tumor development and many studies have shown that tumor cells in hypoxic regions distant from blood vessels show resistance to chemotherapy or radiation therapy (1).

Symptoms related to Hypoxia!

Table 5.1 Signs and Symptoms of Hypoxia

Safety considerations:

- Presence of symptoms depends on the patient's age, presence of disease process, level of health, and presence of chronic illness.
- Consider any underlying causes of hypoxia, such as COPD, heart failure, anemia, and pneumonia, which need to be corrected to prevent and manage hypoxia (Perry et al., 2007).
- Early signs of hypoxia are anxiety, confusion, and restlessness; if hypoxia is not corrected, hypotension will develop.
- As hypoxia worsens, the patient's vital signs, activity tolerance, and level of consciousness will decrease.
- Late signs of hypoxia include bluish discoloration of the skin and mucous membranes, where vasoconstriction of the peripheral blood vessels or decreased hemoglobin causes **cyanosis**. Cyanosis is most easily seen around the lips and in the oral mucosa. Never assume the absence of cyanosis means adequate oxygenation.

Signs and Symptoms	Indications
Tachypnea	Increased respiration rate is an indication of respiratory distress.
Dyspnea	Shortness of breath (SOB) is an indication of respiratory distress.
Use of accessory muscles	Use of neck or intercostal muscles when breathing is an indication of respiratory distress.
Noisy breathing	Audible noises with breathing, or wheezes and crackles, are an indication of respiratory conditions. Assess lung sounds for adventitious sounds such as wheezing or crackles. Secretions can plug the airway, thereby decreasing the amount of oxygen available for gas exchange in the lung.
Decreased oxygen saturation levels	Oxygen saturation levels should be between 92% and 98% for an adult without an underlying respiratory condition. Lower than 92% is considered hypoxic. For patients with COPD, oxygen saturation levels may range from 88% to 92%. Lower than 88% is considered hypoxic.
Flaring of nostrils or pursed lips	Patients who are hypoxic may breathe differently, which may signal the need for supplemental oxygen.
Skin colour of patient	Changes in skin colour to bluish or gray are a late sign of hypoxia.
Position of patient	Patients in respiratory distress may voluntarily sit up or lean over by resting arms on their legs to enhance lung expansion. Patients who are hypoxic may not be able to lie flat in bed.
Ability of patient to speak in full sentences	Patients in respiratory distress may be unable to speak in full sentences, or may need to catch their breath between sentences.
Change in mental status or loss of consciousness (LOC)	This is a worsening and a late sign of hypoxia.
Restlessness or anxiety	This is an early sign of hypoxia.

Data source: British Thoracic Society, 2008; Perry et al., 2014