Gliomas are tumors that originate in the central nervous system from glial cells, being glioblastoma the most aggressive tumor, which is characterized by rapid and infiltrative growth, along with a poor prognosis owing to poor response to treatment. Glioblastoma is distinguished also by an abundant and aberrant vasculature, due to the tumor’s ability to induce the formation of new vessels by mechanisms that mimic physiological angiogenesis. Knowledge of these processes, as well as molecules and cells involved, is useful for the discovery of new therapeutic targets. In addition, the similarities observed between human and canine gliomas places this species as an ideal model for the study of gliomas.

Glioma-derived angiogenesis

In order to survive, tumor cells are capable to induce the formation of new vessels through several mechanisms, which are:

1. **Sprouting angiogenesis**: it has an important role in glioma angiogenesis.
2. **Vascular co-option**: migration of cancerous cells along the vessels and hijacking of proximal vessels.
3. **Intussusceptive angiogenesis**: sprouting angiogenesis switch to this mechanism, allowing a faster growth of new vessels.
4. **Vasculogenic mimcry**: tumor cells replace endothelial cells and form a vessel with lumen and blood flow.
5. **Bone marrow-derived vasculogenesis**: recruitment of circulating endothelial cell precursors by the tumor, which support angiogenesis in a paracrine way or differentiating into endothelial cells.
6. **Cancer stem-like cell-derived vasculogenesis**: GSC transdifferentiate in endothelial cells and integrate in the vessel wall. This process is independent of VEGF and FGF, while hipoxia would be the main regulator.
7. **Myeloid cell-driven angiogenesis**: TAMs (Tumor associated macrophages) and TEMs (Tie-2 expressing monocytes) contribute to the tumor growth and angiogenesis through the expression of proangiogenic factors, and also interact with tip cells, helping with the anastomosis in the sprouting angiogenesis mechanism.

**Conclusions**

- Angiogenesis is a crucial process to survival and invasiveness of gliomas and contributes in the resistance mechanisms against existing treatments.
- Mechanisms of angiogenesis in gliomas are varied and complex, and they interact with each other.
- Understanding the mechanisms of angiogenesis that exist within the tumor will ease the development of new targeted therapies.
- Similarities existing between human and canine gliomas make this species an ideal model for the study of gliomas. Nevertheless, the mechanisms of angiogenesis involved in gliomas have not been studied in the canine species yet.