In summary, selected small molecule inhibitors that have been shown to partially inhibit cancer-specific modified forms of PFK1 may be a suitable means of reducing dysregulated glycolytic flux in cancer cells. The devastating metabolic flux typical of cancer cells can thus be brought under control and reach that of non-proliferating normal cells. Most importantly, the redox balance is restored, eliminating the need to re-oxidize excessive amounts of cytosolic NADH through the simultaneous formation of lactate and superoxide.

Since elevated levels of ROS are thought to trigger neoplastic signaling and equally devastating mutations, modified PFK1 inhibition could thwart the development of several pre-cancerous hallmarks, such as genome instability and mutations, dysregulated cell metabolism, maintenance of proliferation signaling, evasion of growth suppressors, facilitation of replicative immortality, and resistance to cell death.

At the same time, preventing lactate formation could preclude mechanisms involved in the development of other cancer hallmarks, such as triggering angiogenesis, immune escape, tumor-promoting inflammation, and metastasis (**Fig. 9**).

The accumulation of lactate and ROS is the key factor in the development of solid tumors. These arguments support the hypothesis that cancer-specific, highly active modified PFK1s are the “key players” in cancer development and progression. Therefore, reduced PFK1 activity in cancer cells could prevent both early development in the pre-cancerous stage and progression in the later stages of invasive cancers.