Biological character of prostate cancer cells in three-dimensional culture

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Prostate cancer is one of the most common cancers in men of the Western countries, especially the United States of America. In Japan, the incidence has been increasing, although the value is still relatively low. Androgens play a major role in promoting the development and progression of prostate cancer. As a result, androgen ablation or blockade of androgen action has been the cornerstone of treatment of advanced prostate cancer. Although this hormonal therapy produces a significant clinical response in most of the patients, most responders eventually lose dependency, resulting in mortality. Thus, patients with hormone refractory prostate cancer must be treated with a non-hormonal agent. However, most of non-hormonal agents had little or no impact on the survival of patients with advanced cancer. A pre-clinical experimental model simulating the clinical profile of prostate cancer is necessary to explore the progression of chemoresistant prostate cancer. Multicellular tumor spheroids, one type of three-dimensional culture, are a well-studied *in vitro* tumor tissue model and can mimic some of the *in vivo* microenvironmental characteristics of solid tumors, including anchorage-independent growth, that are fundamental to tumor progression. The tumor microenvironment may play a key role in responses to environmental stress, including responses to drugs. Since multicellular tumor spheroids reproduce the tumoral microenvironment more accurately than conventional monolayer culture systems, they might act as better models for the biological and biochemical characteristics of solid tumors.

This study will present biological alterations in a series of LNCaP prostate tumor cells isolated under different growing conditions to evaluate differences between *in vivo* and *in vitro* cellular responses.