

Near-Universal Diagnostic For Malignant Tumors

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ABSTRACT

A grave limitation of current tumor diagnostics is the inability of any one diagnostic to detect a broad range of tumor types. Another serious limitation is that current tumor diagnostics generally have poor sensitivity, requiring that the tumor be 1 centimeter or larger in diameter for reliable detection. As a consequence, there is currently no single diagnostic that can be used in a routine manner, such as in an annual physical exam, to thoroughly assess for the presence of all types of tumors. This particularly applies for detecting early-stage tumors before they cause overt symptoms - the stage where treatment could be most successful.

In 1930 the famous physiologist Otto Warburg reported that one of the most universal characteristics of malignant tumors larger than microscopic size is their hypoxic/acidic areas. Onco-tool diagnostics now under development are designed to be selectively sequestered in such acidic areas. Because onco-tools exploit this near-universal property of tumors (acidic areas), onco-tool diagnostics are expected to detect essentially all types of malignant tumors and all sizes larger than about 1 millimeter in diameter (tumors begin to form acidic areas when smaller than 1 millimeter in diameter). Such a 1 mm diameter tumor has a volume which is a thousand fold smaller than the tumor volume required for detection with current tumor diagnostics. Further, by virtue of the onco-tools' novel multi-acid structures, unique engineered pKa values, and adjusted pH-dependent lipophilicities, they are designed to provide an unprecedented many-fold greater specificity and sensitivity for tumors than is afforded by current tumor diagnostics. Still further, special methods of use can provide a further large increase in the sensitivity and specificity of onco-tool diagnostics.

As a consequence of their activity against most or all tumor types, their high sensitivity, and their unprecedented specificity for acidic areas, when used in routine annual physical exams onco-tool diagnostics are expected to reliably detect nearly all malignant tumors larger than microscopic size.

[The first onco-tool will be available as a research reagent in 2008.]

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