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(54) Title: PROTEIN EXPRESSION PROFILING

(57) Abstract: Disclosed are compositions and methods for detecting small quantities of analytes such as proteins and peptides. The method involves associating a primer with an analyte and subsequently using the primer to mediate rolling circle replication of a circular DNA molecule. Amplification of the DNA circle is dependent on the presence of the primer. Thus, the disclosed method produces an amplified signal, via rolling circle amplification, from any analyte of interest. The amplified DNA remains associated with the analyte, via the primer, and so allows spatial detection of the analyte. The disclosed method can be used to detect and analyze proteins and peptides. Multiple proteins can be analyzed using microarrays to which the various proteins are immobilized. A rolling circle replication primer is then associated with the various proteins using a conjugate of the primer and a molecule that specifically binds the proteins to be detectable. Rolling circle replication from the primers results in production of a large amount of DNA at the sites in the array where the proteins are immobilized. The amplified DNA serves as a readily detectable signal for the proteins. The disclosed method can also be used to compare the proteins expressed in two or more different samples. The information generated is analogous to the type of information gathered in nucleic acid expression profiles. The disclosed method allows sensitive and accurate detection and quantitation of proteins expressed in any cell or tissue.

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