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(54) **Title:** TWODIMENSIONAL STRANDNESS- AND LENGTH-DEPENDENT SEPARATION OF NUCLEIC ACID FRAGMENTS

(57) **Abstract:** A method is provided for separating single- and double-stranded nucleic acid molecules based on their strandness and length. The method is based on novel two-dimensional gel electrophoresis techniques comprises loading a sample of nucleic acid molecules in a gel electrophoresis apparatus and electrophoresing in a first dimension said sample through a gel matrix under a first set of pre-determined electrophoresis conditions; electrophoresing said gel matrix in a second dimension under a second set of electrophoresis conditions, such that populations of single- and double-stranded nucleic acids are separated, said first and second electrophoresis conditions being different, such that in one dimension electrophoresis allows separation of the sample molecules based on strandness and length, and in the other dimension electrophoresis allows separation based substantially on length, wherein said difference is established with a chemical agent and/or physical parameter affecting the strandness-dependent electrophoresis migration rate of nucleic acids

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