a limited biological index only in a limited time, and statistically average the index, various characteristics acquired by various people included in a group over time are abstracted accordingly. In addition, as opposed to basic biology emphasizing a micro-scale issue, clinical research handles, as a clinical outcome, a macro-scale issue of an individual level such as a physical disability, a loss of a physiological function, and a particular illness or body condition. In basic biology and clinical research, a gap is included between levels.

[0012]

In addition, a current treatment strategy is forced to construct a disease by abstracting diversification acquired over time, and thus every treatment strategy is a symptomatic therapy. However, an original health state may not be recovered from a disease by alleviating a symptom.

[0013]

These issues indicate that a concept of a current basic biology or clinical practice may not predict and control a future change in a human biological state, making it difficult to develop an effective prevention scheme and treatment scheme.

[0014]

Embodiments of the present invention have~~The present technology has~~ been contrived in view of the above circumstances, and may predict and control a future change in a human biological state.

SOLUTIONS TO PROBLEMS

[0015]

According to a first aspect of the present invention, there is provided~~An aspect of the technology is~~ a biological

[0021]

According to abovean aspect ~~of the technology~~, an expression level of molecules in an organism is measured over a specific time interval, measured time-series data is divided into a periodic component, an environmental stimulus response component and a baseline component, constant regions of the time-series data are identified from variations in the baseline component or from the amplitude or periodic variations of the periodic component, and causal relation between the identified constant regions is identified. Changes in the state of the organism are inferred from the identified causal relation between the constant regions.

[0022]

A biological information processing device, a recording medium, and a program of the above aspect of the inventiontechnology are a biological information processing device, a recording medium, and a program corresponding to the biological information processing method of the above aspect of the inventiontechnology ~~described above~~.

[0022a]

According to a second aspect, there is provided a biological information processing device comprising: a measurement unit that measures an expression level of molecules in an organism over a specific time interval; a dividing unit that divides measured time-series data into a periodic component, an environmental stimulus response component and a baseline component; an identification unit that identifies constant regions of the time-series

data from variations in the baseline component or from the amplitude or periodic variations of the periodic component, and identifies causal relation between the identified constant regions; and an inference unit that infers changes in the state of the organism from the identified causal relation between the constant regions.

[0022b]

According to a third aspect, there is provided a recording medium having recorded therein a program that causes a computer to execute the steps of: measuring an expression level of molecules in an organism over a specific time interval; dividing measured time-series data into a periodic component, an environmental stimulus response component and a baseline component; identifying constant regions of the time-series data from variations in the baseline component or from the amplitude or periodic variations of the periodic component, and identifying causal relation between the identified constant regions; and inferring changes in the state of the organism from the identified causal relation between the constant regions.

[0022c]

According to a fourth aspect, there is provided a program that causes a computer to execute the steps of: measuring an expression level of molecules in an organism over a specific time interval; dividing measured time-series data into a periodic component, an environmental stimulus response component and a baseline component; identifying constant regions of the time-series data from

variations in the baseline component or from the amplitude or periodic variations of the periodic component, and identifying causal relation between the identified constant regions; and inferring changes in the state of the organism from the identified causal relation between the constant regions.

[0023]

Disclosed herein~~Another aspect of the technology~~ is a biological information processing method including the steps of: acquiring cell memory information of a biological molecule of an organism of a subject; acquiring environmental information associated with an environmental condition of the organism of the subject; acquiring gene information associated with a gene sequence included in the organism of the subject; and searching for similar information of an organism of a person other than the subject associated with the

acquired cell memory information, environmental information, and gene information.

[0024]

The gene information may be a single nucleotide polymorphism and a structural polymorphism.

[0025]

The searching may be performed based on similarity in a correlation among the cell memory information, the environmental information, and the gene information.

[0026]

The step of acquiring cell memory information includes the steps of: measuring an expression level of molecules in an organism of the subject over a specific time interval; dividing measured time-series data into a periodic component, an environmental stimulus response component and a baseline component; and identifying constant regions of the time-series data from variations in the baseline component or from the amplitude or periodic variations of the periodic component, and identifying causal relation between the identified constant regions.

[0027]

According to the above disclosure~~other aspect of the technology~~, cell memory information of a biological molecule of an organism of a subject is acquired, environmental information associated with an environmental condition of an organism of the subject is acquired, gene information associated with a gene sequence included in an organism of the subject is acquired, and similar information of an organism of a person other than the subject associated with the acquired cell memory information, environmental

information, and gene information is searched for.

[0028]

A biological information processing device, a recording medium, and a program of the above disclosure~~other aspect of the technology~~ are a biological information processing device, a recording medium, and a program corresponding to the biological information processing method of the ~~other aspect of the technology described~~ above disclosure.

EFFECTS OF THE INVENTION

[0029]

As described above, according to embodiments of the present invention~~an aspect and another aspect of the technology~~, it is possible to predict and control future changes in the state of a human organism.

BRIEF DESCRIPTION OF DRAWINGS

[0030]

Fig. 1 is a block diagram illustrating a configuration of an embodiment of a biological information processing device.

Fig. 2 is a flowchart illustrating a health state prediction and control process.

Fig. 3 is a diagram illustrating a model associated with a causal relation using a constant region as a node.

Fig. 4 is a block diagram illustrating a configuration of another embodiment of a biological information processing device.

Fig. 5 is a flowchart illustrating a prediction and control process of a cellular state of a cultured cell.

Fig. 6 is a diagram illustrating a configuration of