CONFIDENTIAL

“Water Channeling Life” project

Keio University x Suntory

Atsushi Numata
Institute for Water Science

SUNTORY

SUNTORY GLOBAL INNOVATION CENTER

the Water channeling life project

Joint Research Project
by Keio University School of Medicine and Suntory

Water Channeling Life

Keio University and Suntory launched the joint research project, “Water Channeling Life” on April 1, 2015.

The 3 years project aims at

- promoting studies about water circulation in the human body
- finding relationship between water and health.
- dispatching information obtained from the project to improve the quality of life for all people.

Main Themes

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1

Manipulation of intracellular water and cell membrane lipids

Cell biology of aquaporin

2

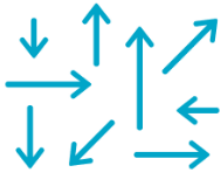
Examining water via light

Aquaphotomics

3

Visualizing dynamics of water in cells

Measuring of water flows in the human body and their simulation



4

Finding out how much water is needed for the human body each day

Fluid intake amount of the Japanese people

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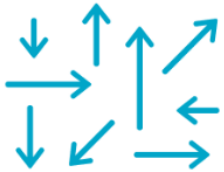

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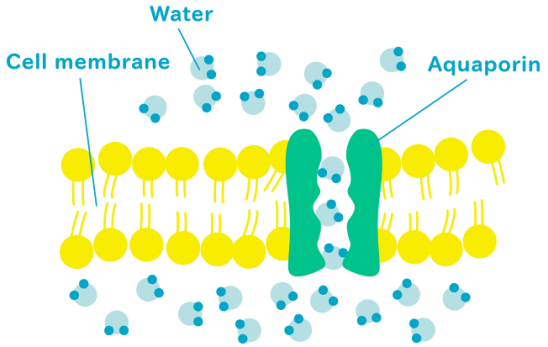


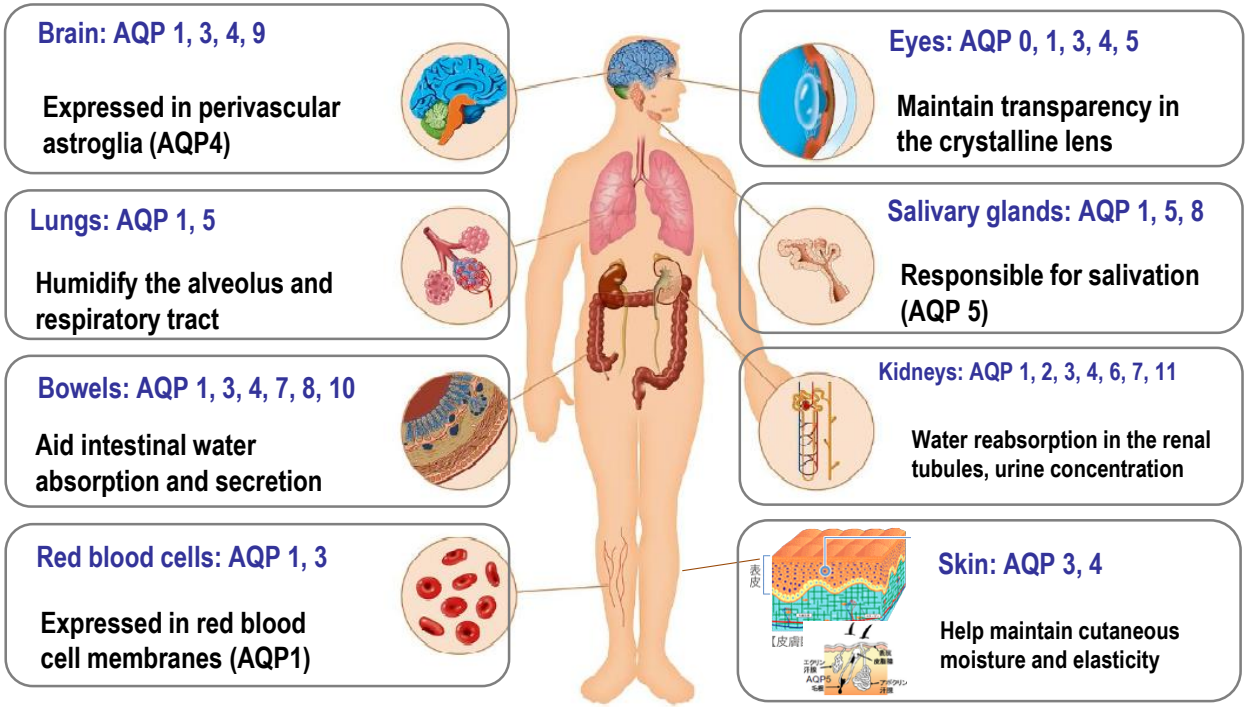
- Aquaporins are integral membrane proteins that form pores and selectively pass water molecules.
- We are focusing on AQP3 and 7.

Human aquaporins

13 types of human aquaporins have been identified (AQP 0–12)

•Aquaporins (AQP 0, 1, 2, 4, 5, 6, 8, 11, 12)
Transporting only water

•Aquaglyceroporins (AQP 3, 7, 9, 10)
Transporting primarily water and glycerol



Source: *Aquaporin roles in the body (Art For Science)*

Cell biology of aquaporins

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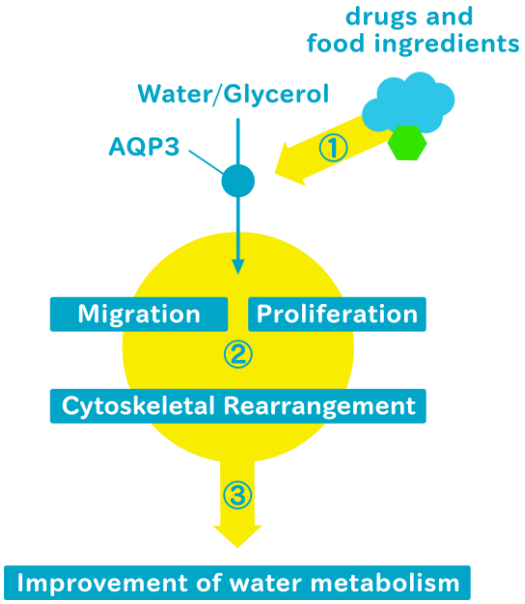
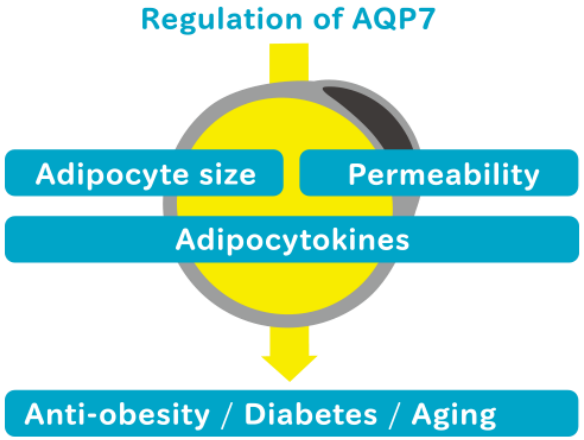
AQP3 in skin

- modulation of AQP3 expression may be able to act positively in the sustainability of skin structure
- intending to determine a method for regulating AQP3 by using external stimuli such as drugs or foods.



AQP7 in white adipose tissue

- Adipocytes maintain the energy homeostasis of whole-body energy
- Aiming to find a way to positively modulate lipid metabolism



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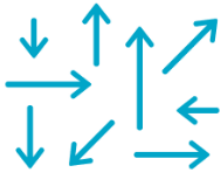

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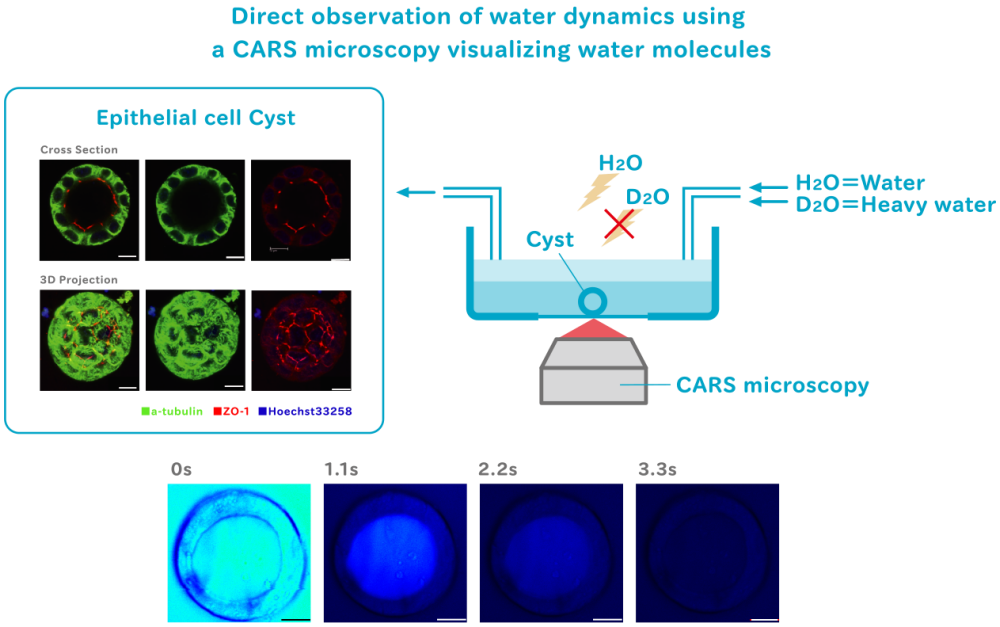
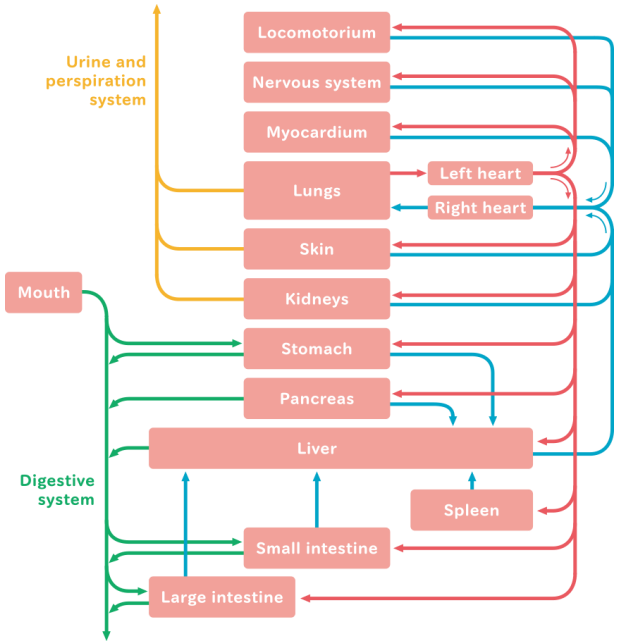
- Little has been known about the dynamics of intracellular and interstitial fluids.
- No techniques for the observation of water “diffusion” dynamics have been available
- Establishing a technique for direct visualization of water dynamics in human tissues and creating a computer simulation model of dynamic water metabolism



Coherent anti-strokes Raman scattering (CARS) microscopy.



a computer simulation model of dynamic and non-equilibrium water dynamics in the human.

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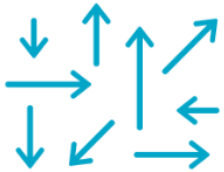

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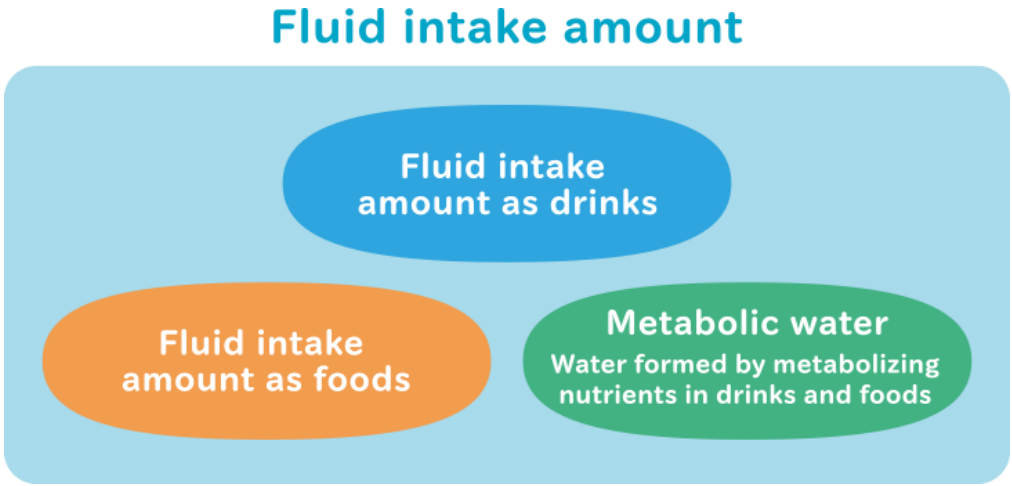
- In the United States, Canada, and countries in Europe, the amount of water required has been set as “adequate intake”, however, not in Japan.
- Because of the differences especially in foods, Japanese criteria are needed.
- It is necessary to develop a technique for recording every food and drink and for calculating the total amount of water intake from all material consumed.



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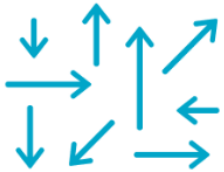

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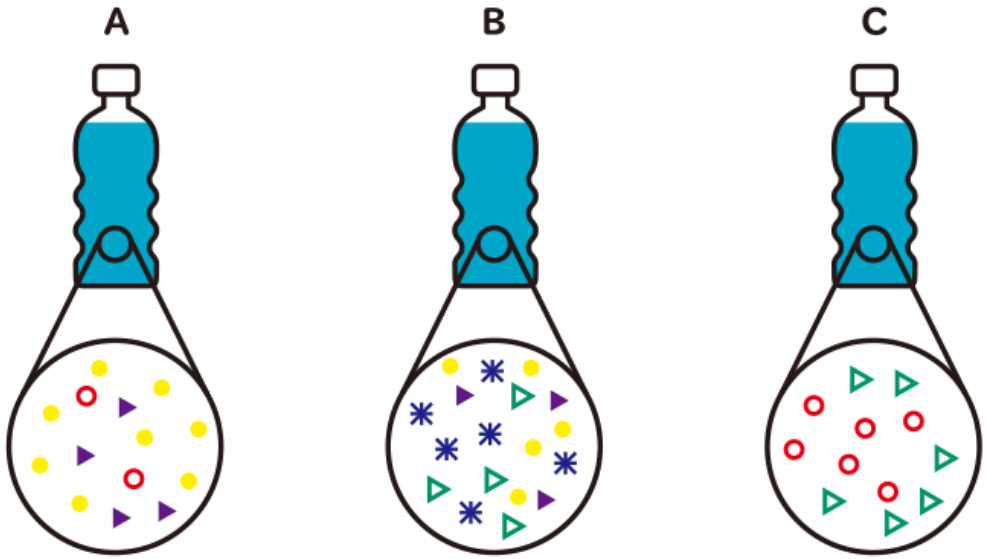
Aquaphotomics

- We have 3 targets, mineral water, skin and urine, intend to understand the relationship between dynamics of water and health.

1. Mineral water

The composition depends on the location of waters' origin

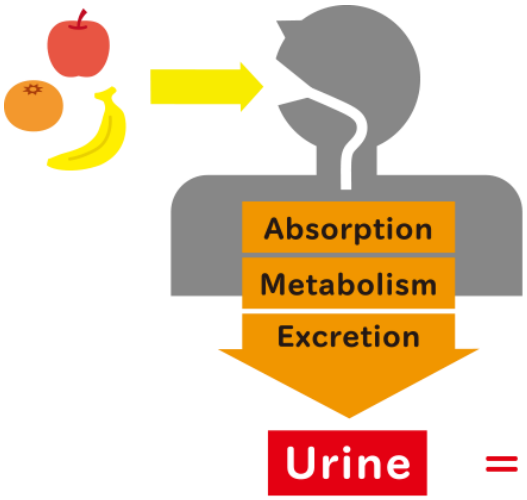


We aim to identify the typical spectrum of each mineral water

Aquaphotomics

2. Urine

- Urine is a rich source of information of human body
- We intend to diagnose the state of human body by urine aquaphotomics.

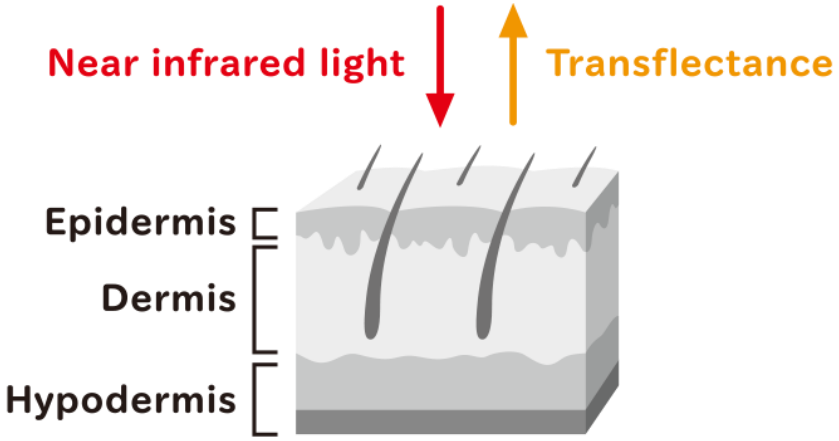


Urine = “Information on material consumed” × “information on metabolism”

We intend to establish a method for extracting comprehensive information about the body

3. Skin

- No ordinal techniques can explain the relationship between the water content of the skin and the condition of the skin directly.
- Near-infrared light can penetrate the epidermis and dermis of the skin, so it must help us collect important information about processes occurring in the skin.



Measuring the near-infrared spectrum identifies age-related changes in the skin

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http://www.water-channeling-life.com/

English page has been released!

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Surprise, Insight, Challenge