



# EFFECTS OF THORON SPA OR BATH ON CANCER PATIENTS

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# Introduction of Our Spa, Medical Spathoron Hanamaki

Hanamaki, Iwate  
prefecture (Tohoku area)

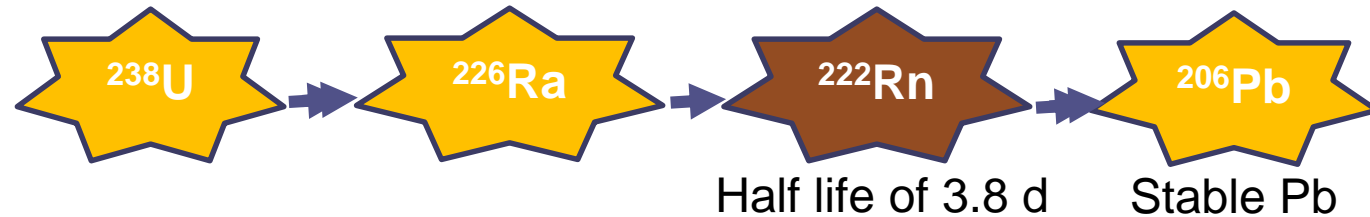


- Our facility, Medical Spathoron Hanamaki, is an **artificial** hot spring containing **thoron**, a radioactive material.
- Most of visitors are intended to improve their health in our **artificial thoron** hot spring.

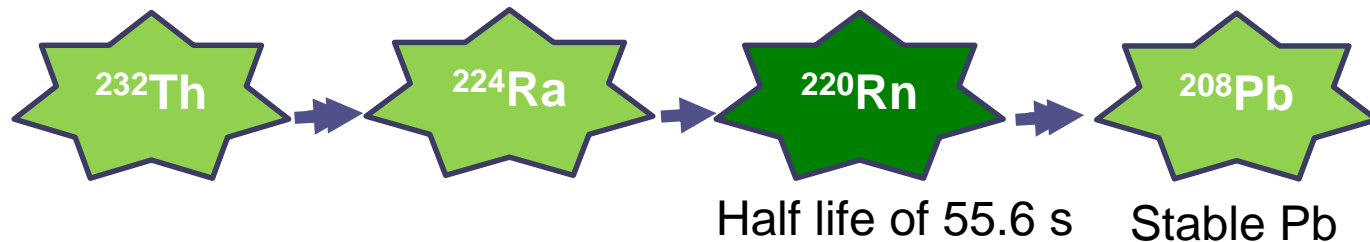
# What is thoron?

Thoron is an isotope of radon.

Radon ( $^{222}\text{Rn}$ ) is a member of the  $^{238}\text{U}$  decay chain and is the  $\alpha$  decay product of  $^{226}\text{Ra}$ .



Thoron ( $^{220}\text{Rn}$ ) is a member of the  $^{232}\text{Th}$  decay chain and is the  $\alpha$  decay product of  $^{224}\text{Ra}$ .



## Comparison of the thoron and the radon hot spring

item \	Radon hot spring	Thoron hot spring
① Radioactive material	The half-life of radon is about <b>3.8 days</b> , and it requires more than <b>20 years</b> until it becomes stable $^{206}\text{Pb}$ .	The half-life of thoron is about <b>55.6 seconds</b> , and it requires around <b>11 hours</b> until it becomes stable $^{208}\text{Pb}$ .
② Hot water	Because of <b>natural</b> hot water, it is difficult to maintain the radioactive effects and to study more effective conditions.	To prepare hot water <b>artificially</b> , it is easy to obtain the radioactive effects stably and to investigate various conditions such as the thoron concentration and the component of hot water.
③ Location	It is difficult to move the place of spa facility because of the <b>natural</b> hot spring.	It is easy to build the spa facilities in the various places because of the <b>artificial</b> hot spring.

**The thoron hot spring is useful as the radioactive spring.**

## Preparation of thoron hot water



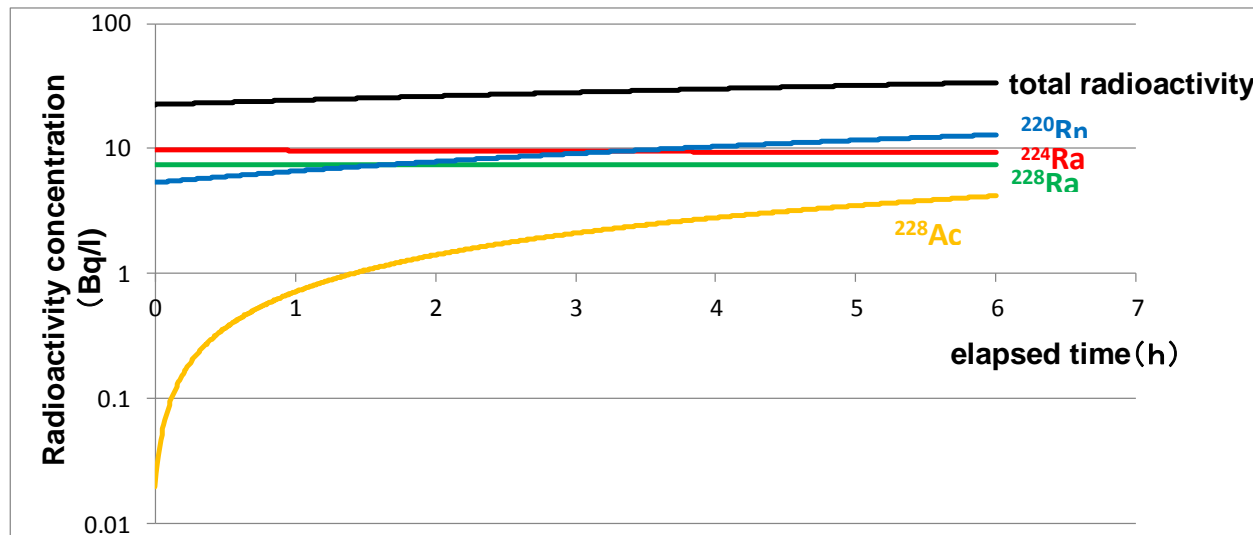
The thoron hot water was prepared using our devices based on the weak acid leaching method.

1. The sand that contains thorium and organic acid allowed to act for 9 hours in our production equipment to prepare the stock solution of thoron.
2. The stock solution was immediately injected into the tub in a certain dilution. This operation was 4 times a day (6:00, 10:00, 15:00 and 19:00).

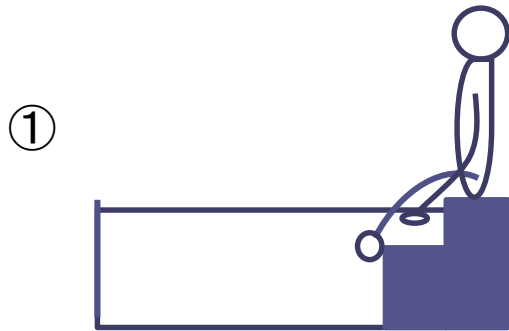
# Radioactive component of thoron hot water

METHODS: A stock solution immediately after thoron preparation was measured by liquid scintillation counter. The values of  $^{220}\text{Rn}$  were estimated from the value of  $^{224}\text{Ra}$ . The following shows the table and graph.

Elapsed time (h)	$^{228}\text{Ra}$ (Bq/l)	$^{228}\text{Ac}$ (Bq/l)	$^{224}\text{Ra}$ (Bq/l)	$^{220}\text{Rn}$ (Bq/l)	Total radioactivity (Bq/l)
0	7.43	0	9.70	0	17.13
0.24	7.43	0.19	9.68	9.68	26.78
2.4	7.43	1.76	9.52	9.52	28.23
4.0	7.43	2.74	9.39	9.39	28.95



# Bathing procedure in the thoron hot spring

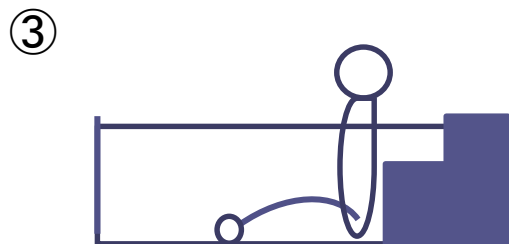


Put hand and foot destination in the bathtub, 3 to 10 minutes

\* 38 to 42°C



3 to 5 minutes in the state of sitz bath



Soak up the shoulder, 1 to 2 minutes

## Case-1

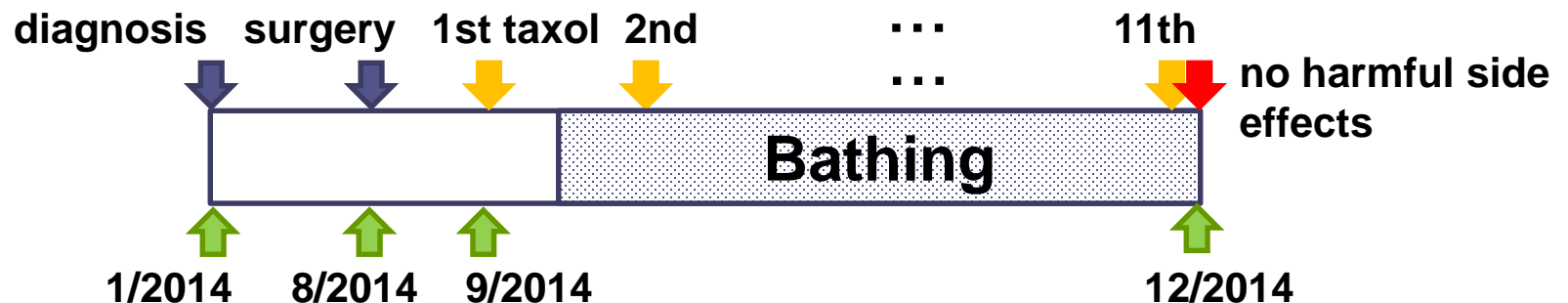
**Diagnosis:** undifferentiated carcinoma of thyroid

**Sex:** male

**Age:** 68 years old

**Progress:** He was diagnosed with undifferentiated carcinoma of thyroid in June 19, 2014, and the surgery to remove the entire tumor was performed in the same year on August 8. The taxol treatment (130 mg/body) was started from September 16 of the same year. Bathing in the thoron hot spring (every day, 6 to 8 times a day, and bathing of each 10 minutes) began just before the second taxol treatment.

**Effect:** Reduction of harmful side effects of anti-cancer drug





# Case-1

Standard taxol treatment

## 【Dosage and Usage】

The schedule is to give 210 mg/m<sup>2</sup> of taxol by intravenous drip infusion, followed by **withdrawal from medication for at least 3 weeks**. Repeating this administration.

1st taxol



**Withdrawal of 3 weeks**

Alternatively, another is to give 100 mg/m<sup>2</sup> of taxol by intravenous drip infusion once a week for **six consecutive weeks**, followed by **withdrawal from medication for at least two weeks**. Repeating this administration.

1st taxol



1 week

2nd



1 week

3rd



1 week

4th



1 week

5th



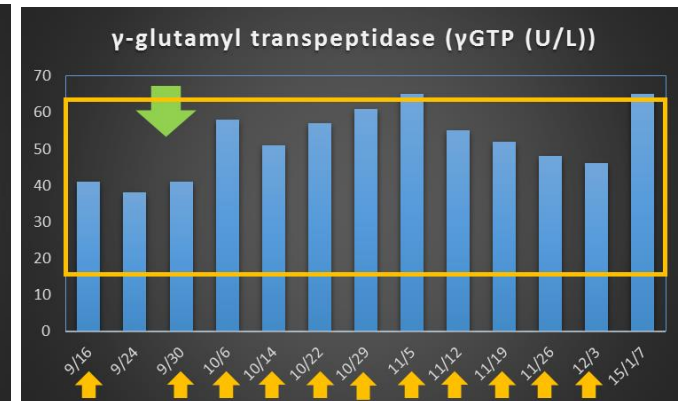
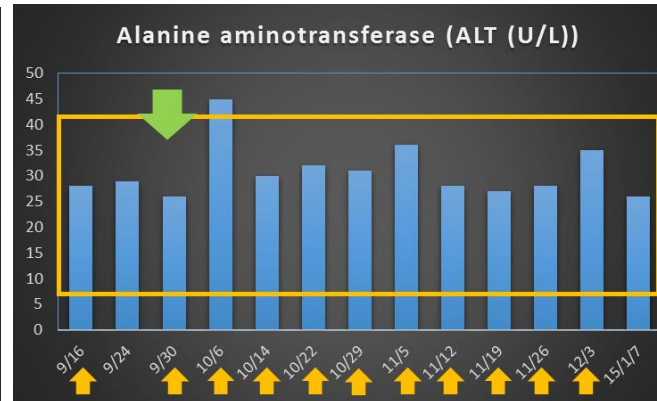
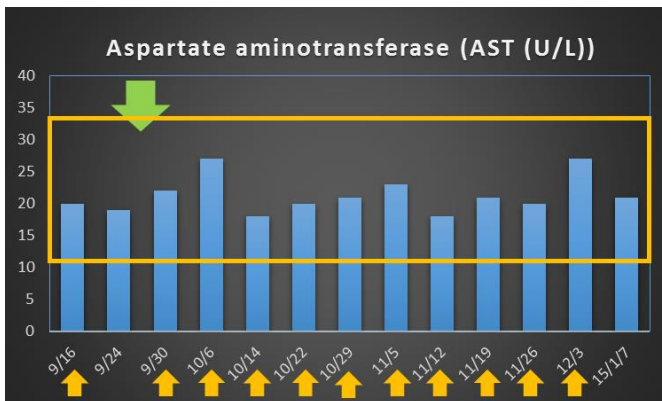
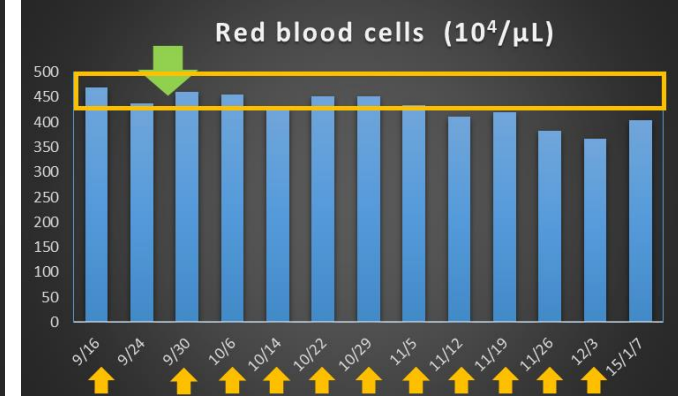
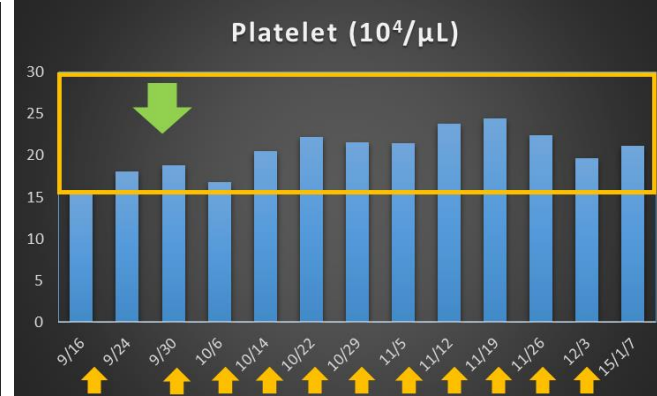
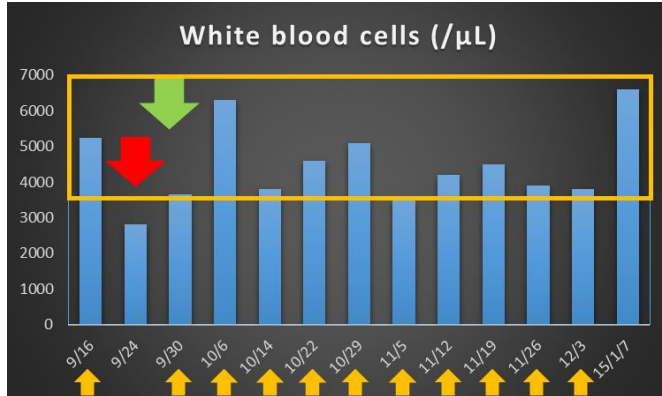
1 week

6th



**Withdrawal of 2 weeks**

# Case-1



## Side effect

Peripheral neuropathy was not observed.

↑ start of bathing

↑ decrease in white blood cells

↑ taxol treatment

□ normal range

## Case-2

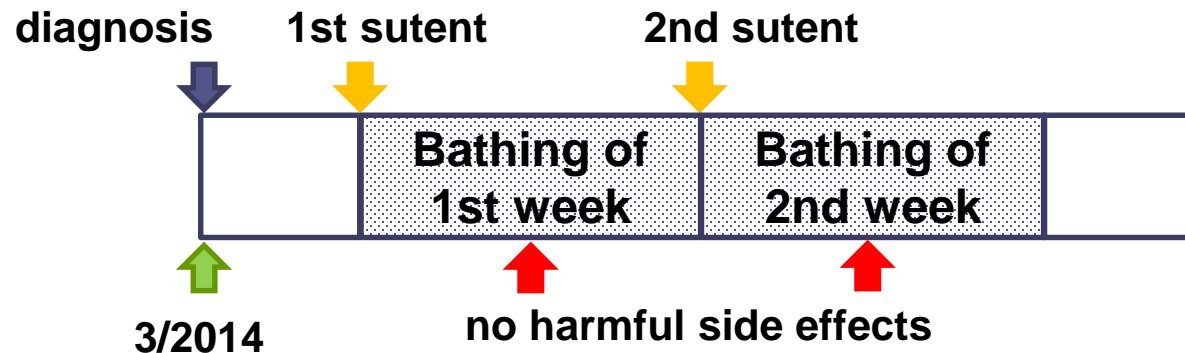
**Diagnosis:** renal cell cancer

**Sex:** male

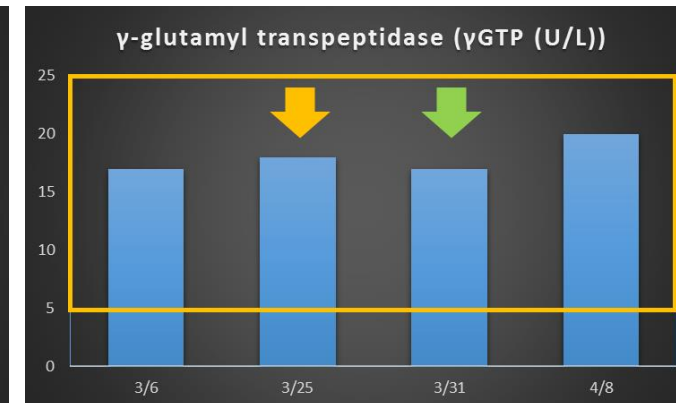
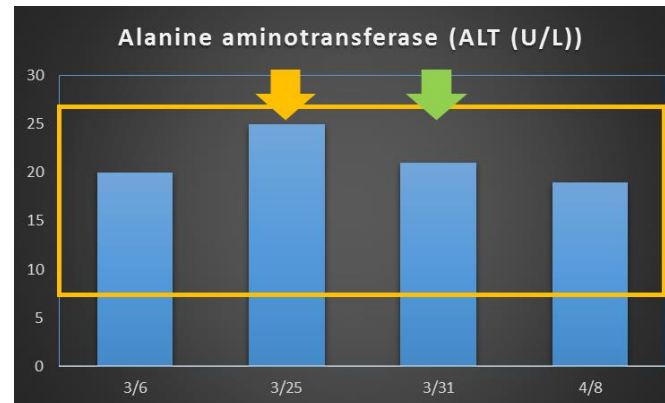
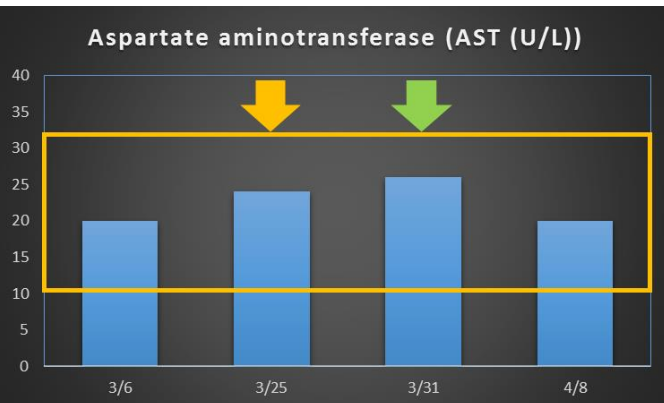
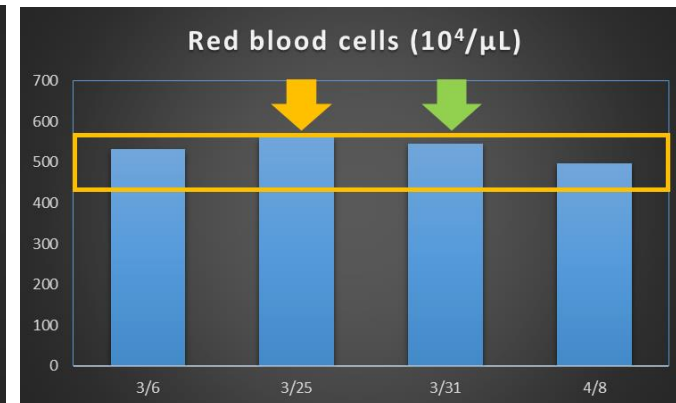
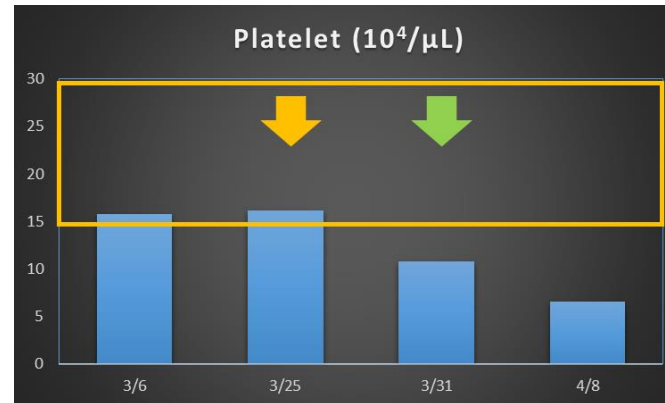
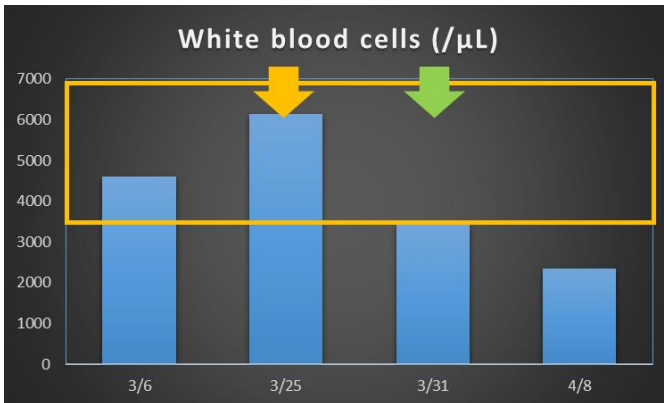
**Age:** 66 years old

**Progress:** He was diagnosed with renal cell cancer in March 6, 2014. The sunitinib treatment (37.5 mg/body) was started from March 19 of the same year for two consecutive weeks.

**Effect:** Reduction of harmful side effects of anti-cancer drug



# Case-2



↑ Sutent treatment of the first week (bathing number of **high-frequency**)

↑ Sutent treatment of the second week (bathing number of **low-frequency**)

□ normal range

## Case-3

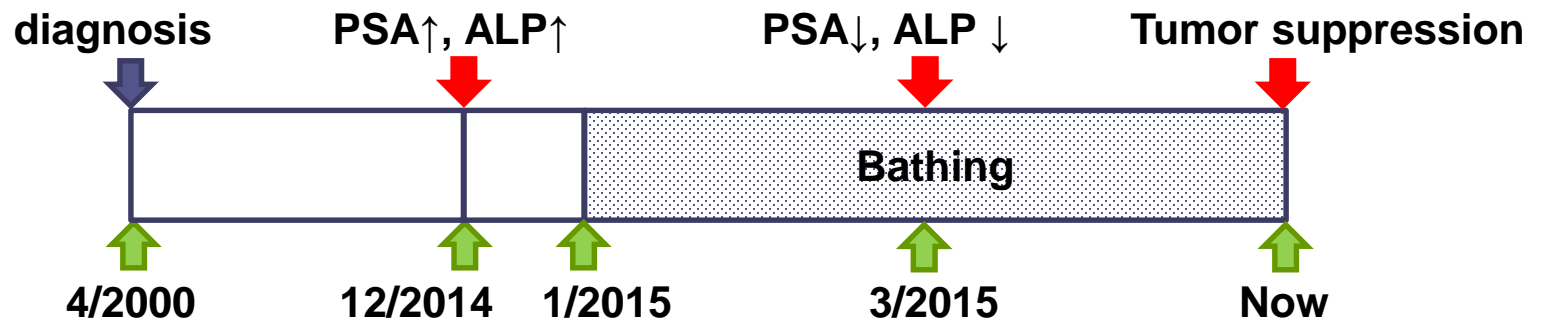
**Diagnosis:** prostate cancer

**Sex:** male

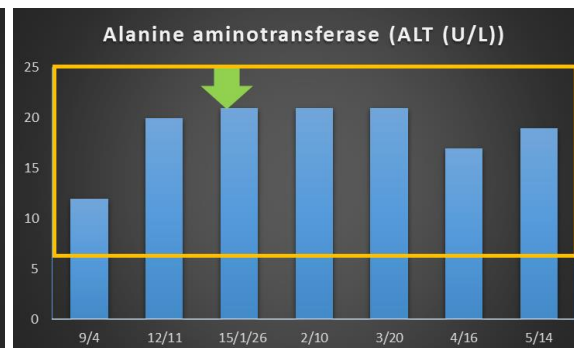
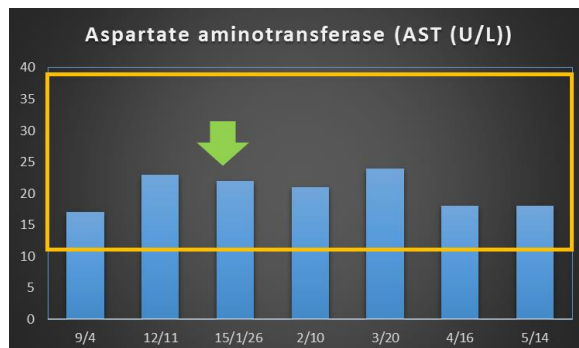
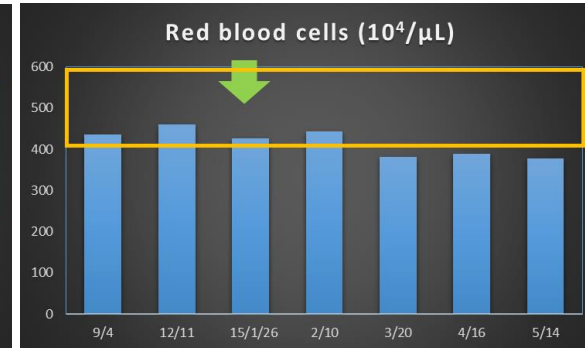
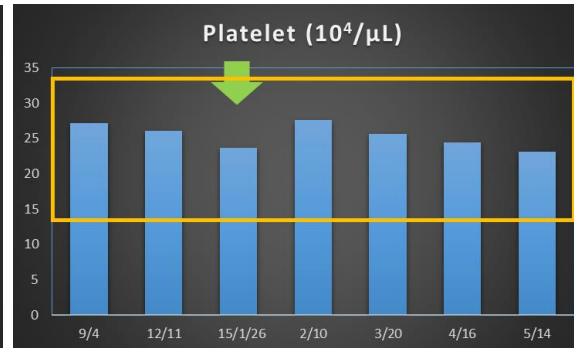
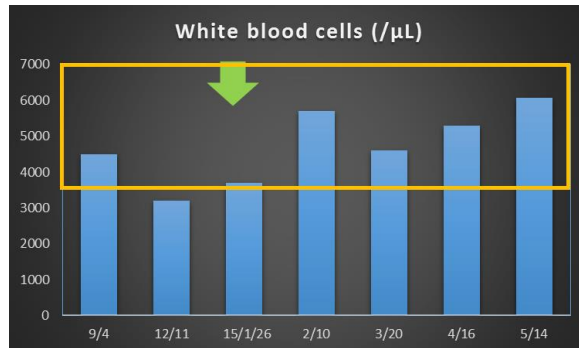
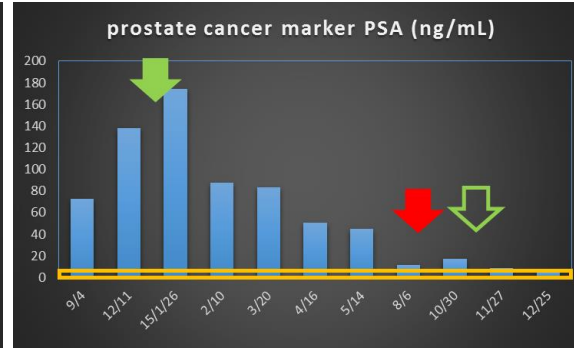
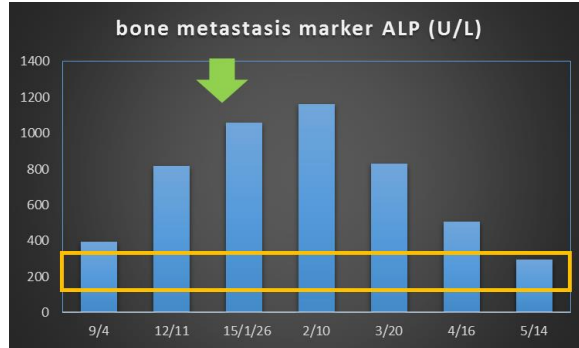
**Age:** 68 years old





**Progress:** He was diagnosed with prostate cancer in August 2000. The rapid rise in PSA, a prostate cancer marker was observed in December 11, 2014. In addition, bone metastasis was observed. Bathing in the thoron hot spring (every day, 6 to 8 times a day, and bathing of each 10 minutes) began from January 10, 2015.

**Effect:** Tumor suppression



# Case-3



-  start of bathing
-  pause of bathing
-  resumption of bathing
-  normal range

## Case-4

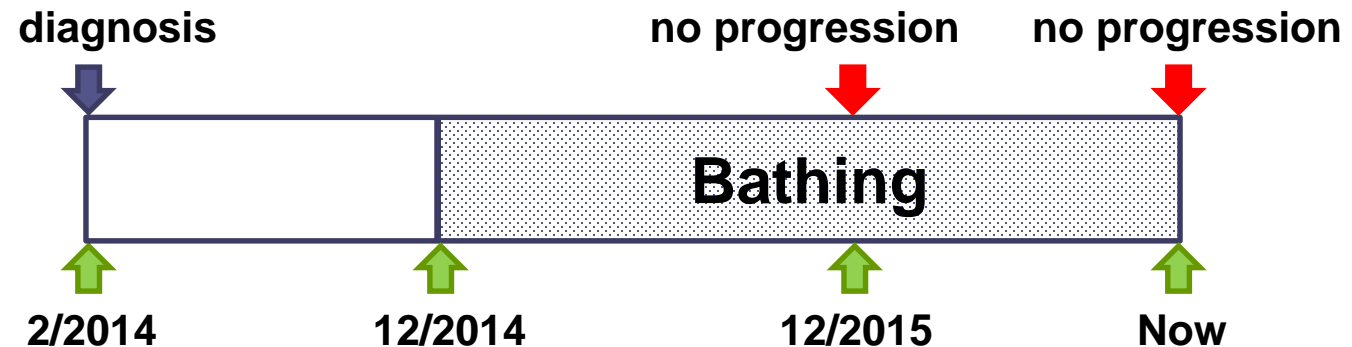
**Diagnosis:** pleural mesothelioma

**Sex:** male

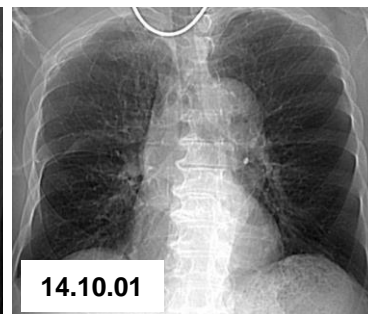
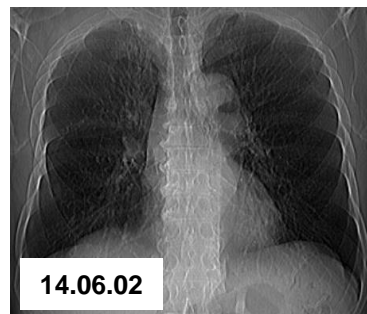
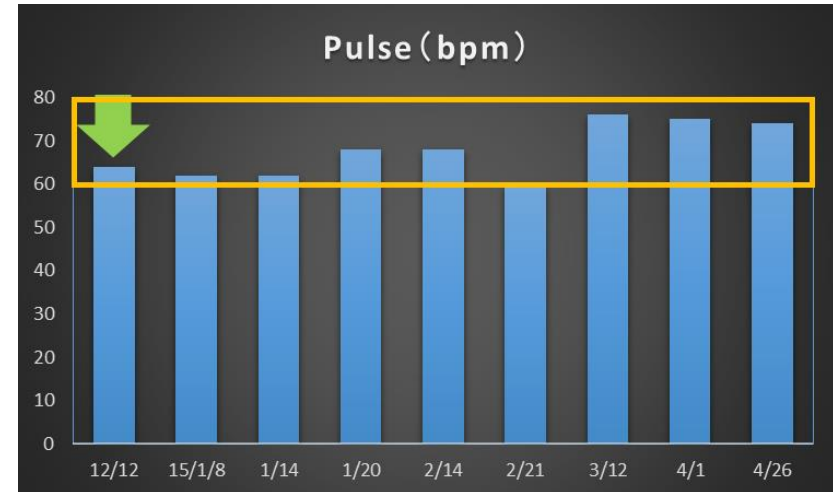
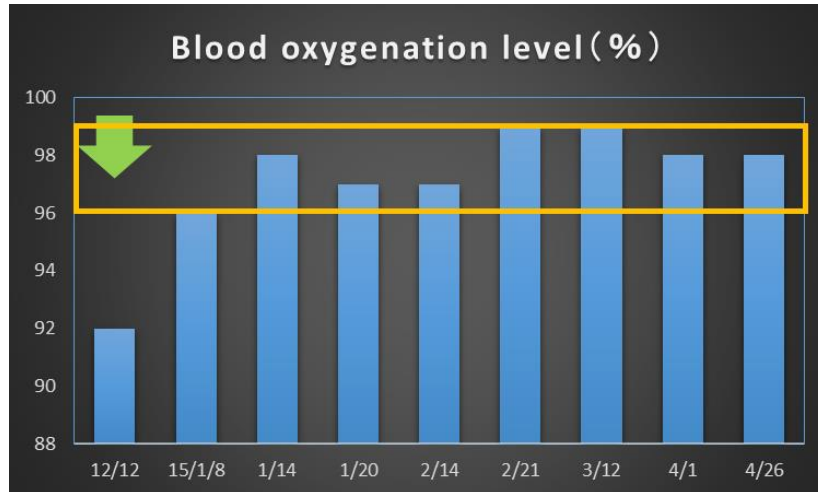
**Age:** 67 years old

**Progress:** He was diagnosed with pleural mesothelioma in February 2014.  
Bathing in the thoron hot spring (every day, 6 to 8 times a day ,  
and bathing of each 10 minutes) began from December 12, 2014.

**Effect:** Tumor suppression



# Case-4



He was diagnosed that his cancer progression was almost stopped.

 start of bathing  
 normal range



## Other cases

- A gallbladder cancer patient
  - 64 years old, male
  - Decrease of tumor marker CEA and CA19-9 value was observed after bathing.
- A oropharyngeal cancer patient
  - 55 years old, male
  - Skin damage with radiation therapy has been significantly improved.
- Others

# Summary

Cases	Effects of thoron hot water
①②	<ul style="list-style-type: none"><li>▪ The bone marrow activity recovered after bathing.</li><li>▪ Peripheral neuropathy by taxol was not observed.</li><li>▪ It was able to perform 10-week continuous administration of taxol.</li></ul>
③④	<ul style="list-style-type: none"><li>▪ Tumor marker level decreased or was restored to the normal range.</li><li>▪ Progression of cancer was suppressed.</li></ul>

## Conclusions

1. It was suggested that the thoron hot spring possibly reduced the side effect of the anticancer drugs.
2. It was suggested that the thoron hot spring possibly had the antitumor function.

We will provide **the print of our presentation file** to the desired person.

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