Using Next generation DNA Sequencer, this study shows the before and after results by skin flora analysis, from treating Acne with Nitrogen Plasma.

AgeJet

Accurate Nitrogen Plasma delivery

Method

・Nitrogen Plasma was used on the cheeks of 10 subjects.
The Skin was irradiated with 1Joule. Air Off.

・After an initial test taken prior to treatment, further test were taken after 24 hours and 72 hours. Indigenous bacteria were collected from an area ϕ3 cm at a distance of 1 cm from the lower eyelid and side of the nose, using dedicated scale template.

Provided by: Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Method

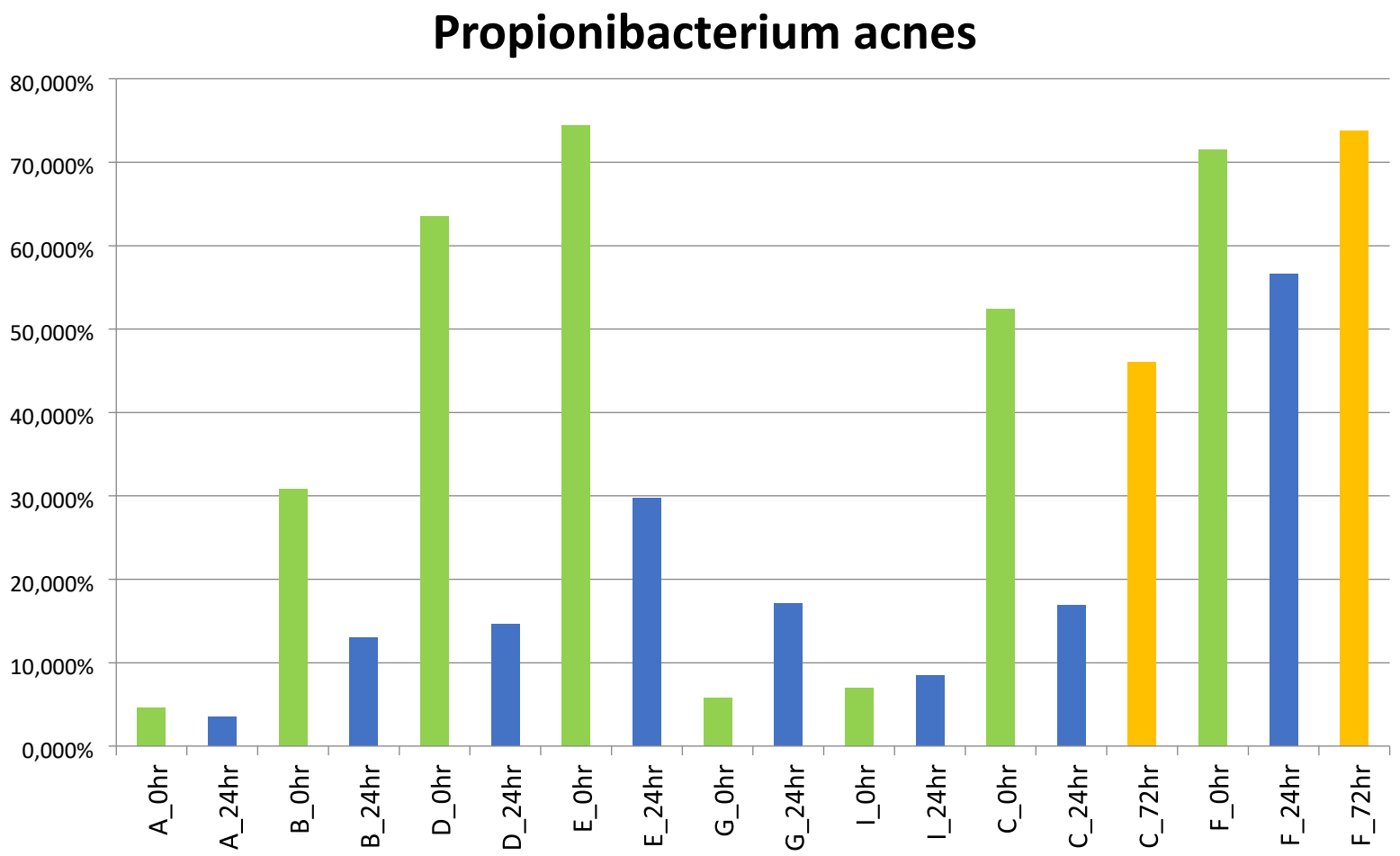
Fungal flora analysis

16seconds after fragmenting and amplifying a DNA sample rRNA V2,3,4,5,6,7,8,9 region sequenceION PGM Read the number of reads with the sequencer

Low quality base, read length 120bp or less were removed from the total bacterial count analysis.

A Takara bacteria Quantitative PCR kit was used to determine by the Real time PCR method.

Provided by: Chiharu Dermatology Clinic, Dr. Chiharu Watanabe


Propionibacterium acnes
80,000%
70,000%
60,000%
50,000%
40,000%
30,000%
20,000%
10,000%
0,000%
A_0hr
A_24hr
B_0hr
B_24hr
D_0hr
D_24hr
E_0hr
E_24hr
G_0hr
G_24hr
I_0hr
I_24hr
C_0hr
C_24hr
C_72hr
F_0hr
F_24hr
F_72hr

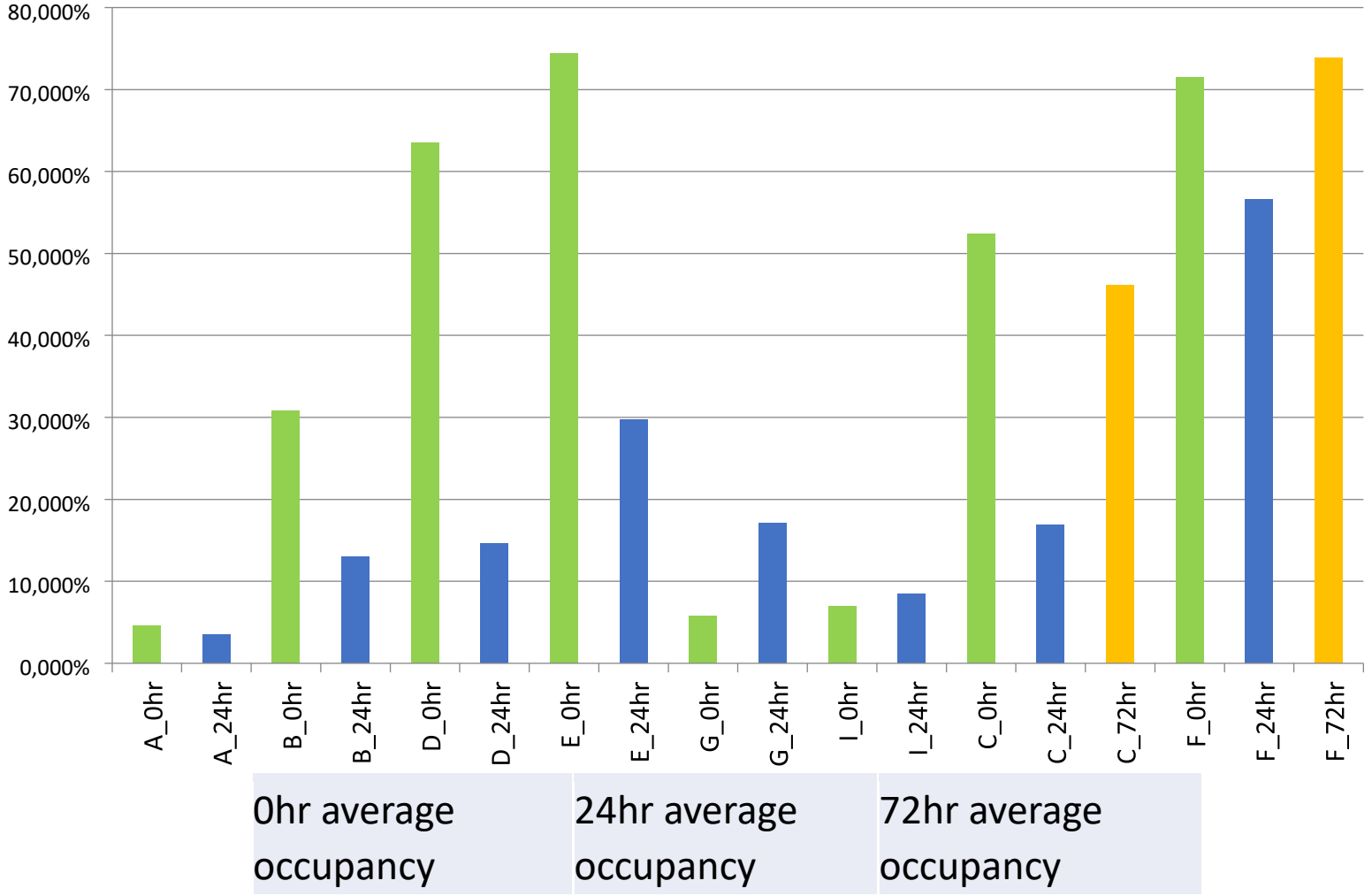
Results-Time series changes of major bacterial species-

Comparison between 0h and 24h: P = 0.054, shows a decrease in P. acnes＊Swab sample errors excluded (H, J subjects),presumed to be caused by subject collection method and DNA deterioration (fragmentation)

Provided by: Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Results- Show time series changes of major bacterial species-

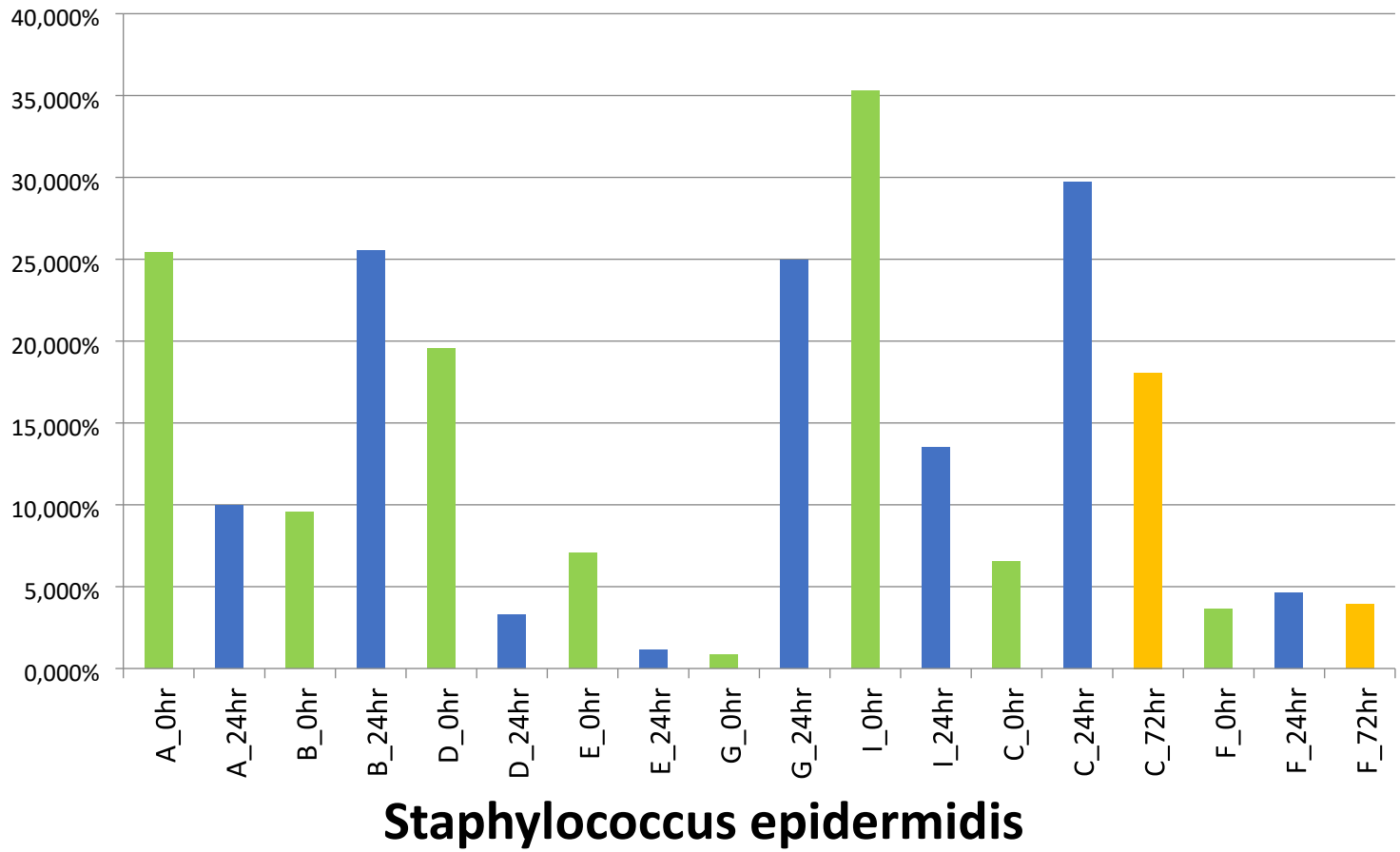
Propionibacterium acnes



Results-Time series changes of major bacterial species-

31.0%	16.0%	35.4%

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

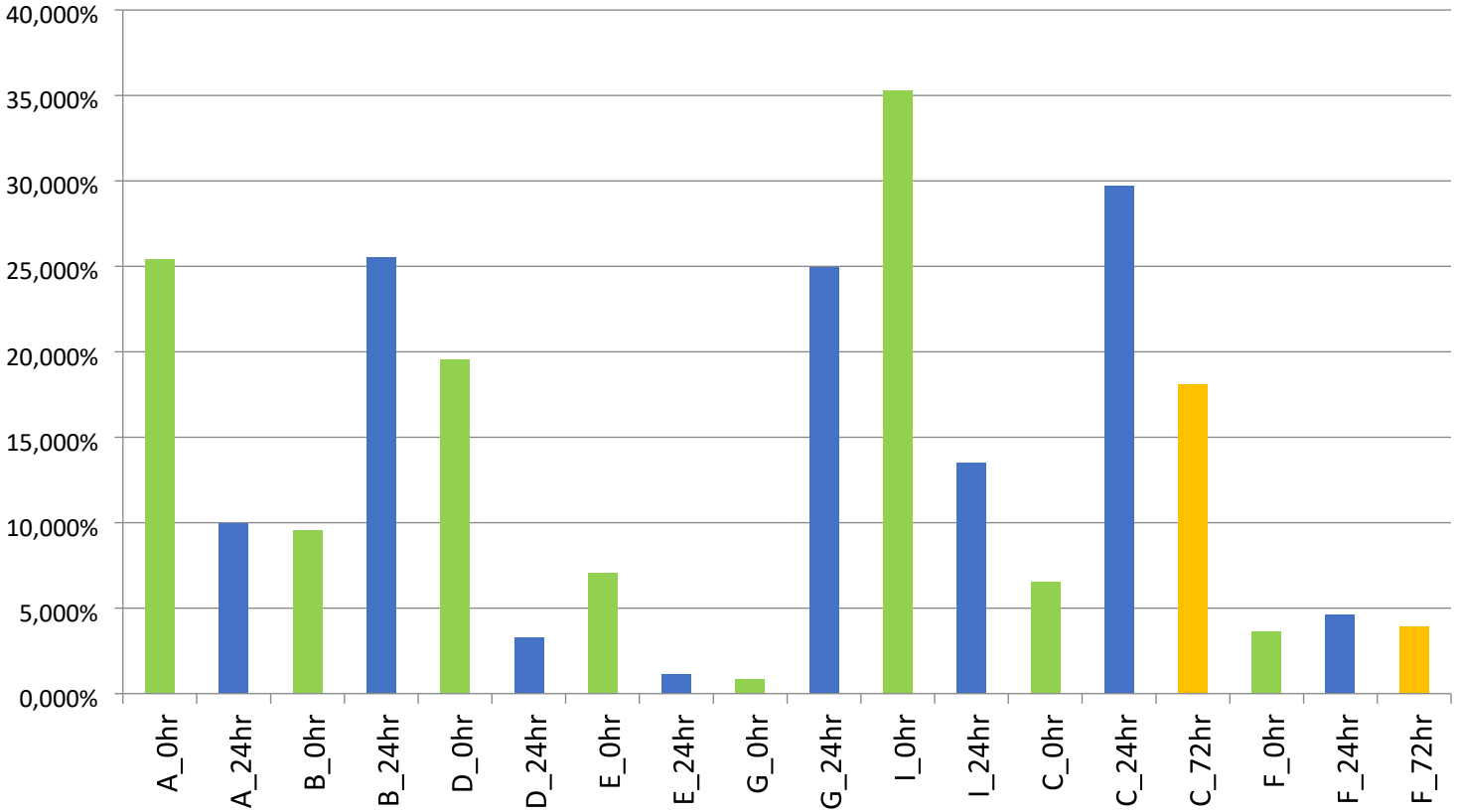


Staphylococcus epidermidis, which is said to be a good bacterium, does not show a decreasing tendency (P = 0.87).)

Results-Time series changes of major bacterial species-

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Results-Time series changes of major bacterial species-



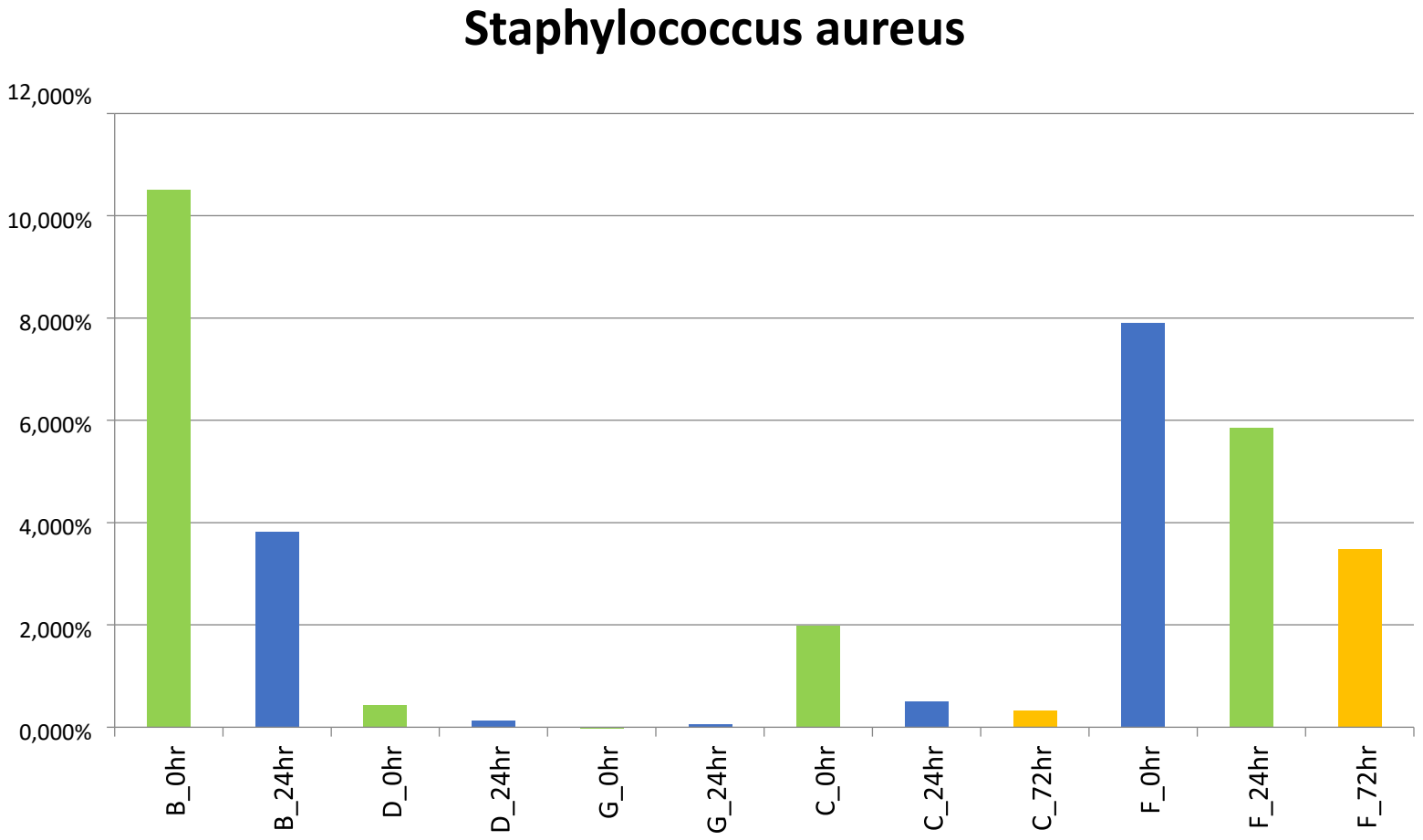
Staphylococcus epidermidis

0hr	24hr	72hr

Results-Time series changes of major bacterial species-

10.8%	11.3%	10.1%

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe



0hr	24hr	72hr
2.528%	1.413%	0.986%

* Results of only 5 atopic patients because Staphylococcus aureus is rarely detected in healthy subjects

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Bacteria Name	0hr average diversity index	24h average diversity index	P value 0hr vs 24hr (Paired T-Test)
Staphylococcus epidermidis	1769	1452	0.828
Propionibacterium acnes	6271	1274	0.25
Staphylococcus aureus	544	200	0.352
Streptococcus thermophilus	6	1	0.352

Results-Time series changes of major bacterial species-

24 hours after plasma irradiation, all four bacterial species decreased, but P. acnes and Staphylococcus aureus decreased significantly.

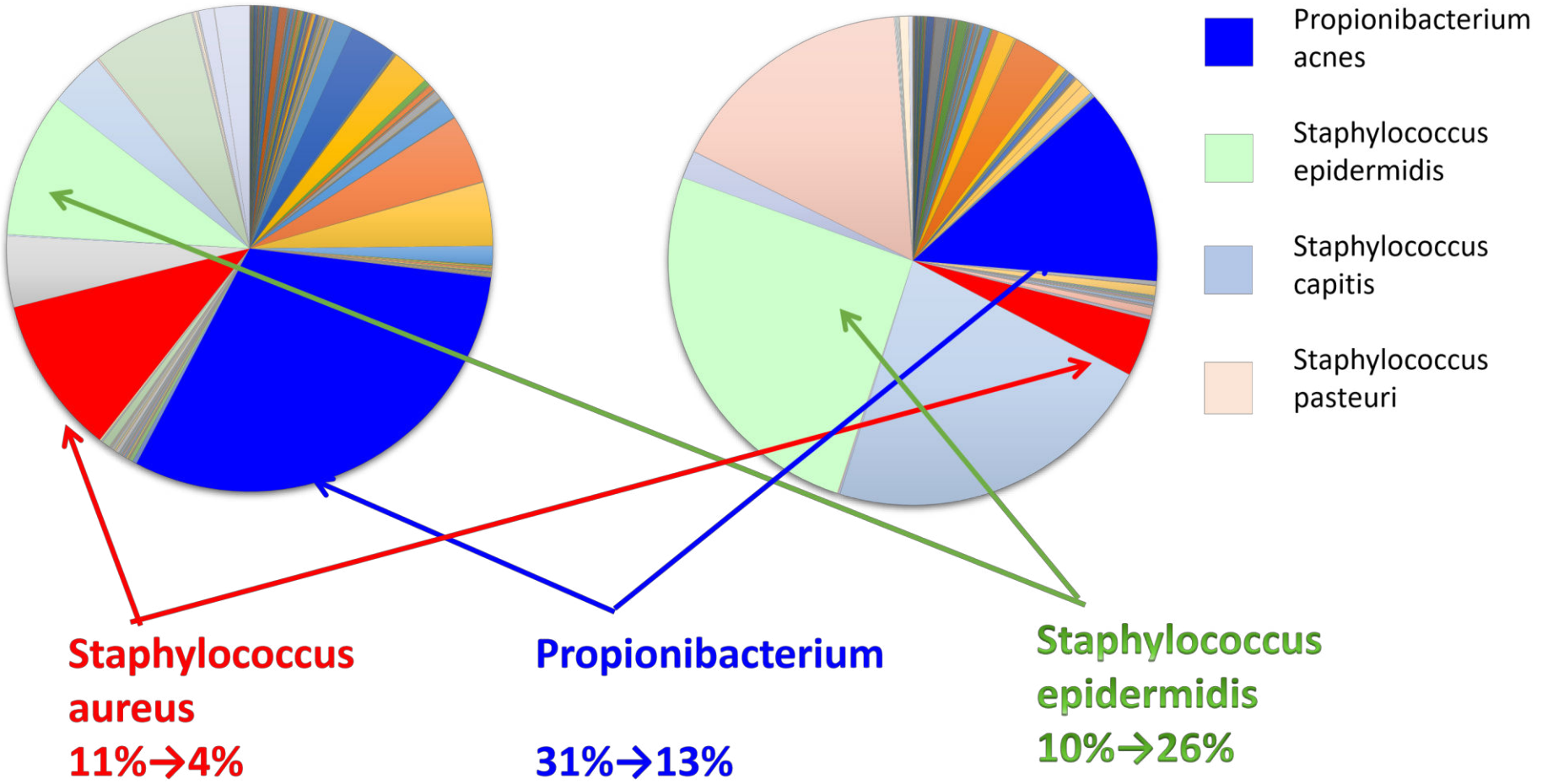
Sample Name	0hr average diversity index	24hr average diversity index	P value 0hr vs 24hr (Paired T-Test)
Simpson's Index	0.734	0.845	0.045

24 hours after plasma irradiation, the diversity index of indigenous skin flora increased. The balance is improved

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Time-series changes of all strains pie data, Atopic Dermatitis patient

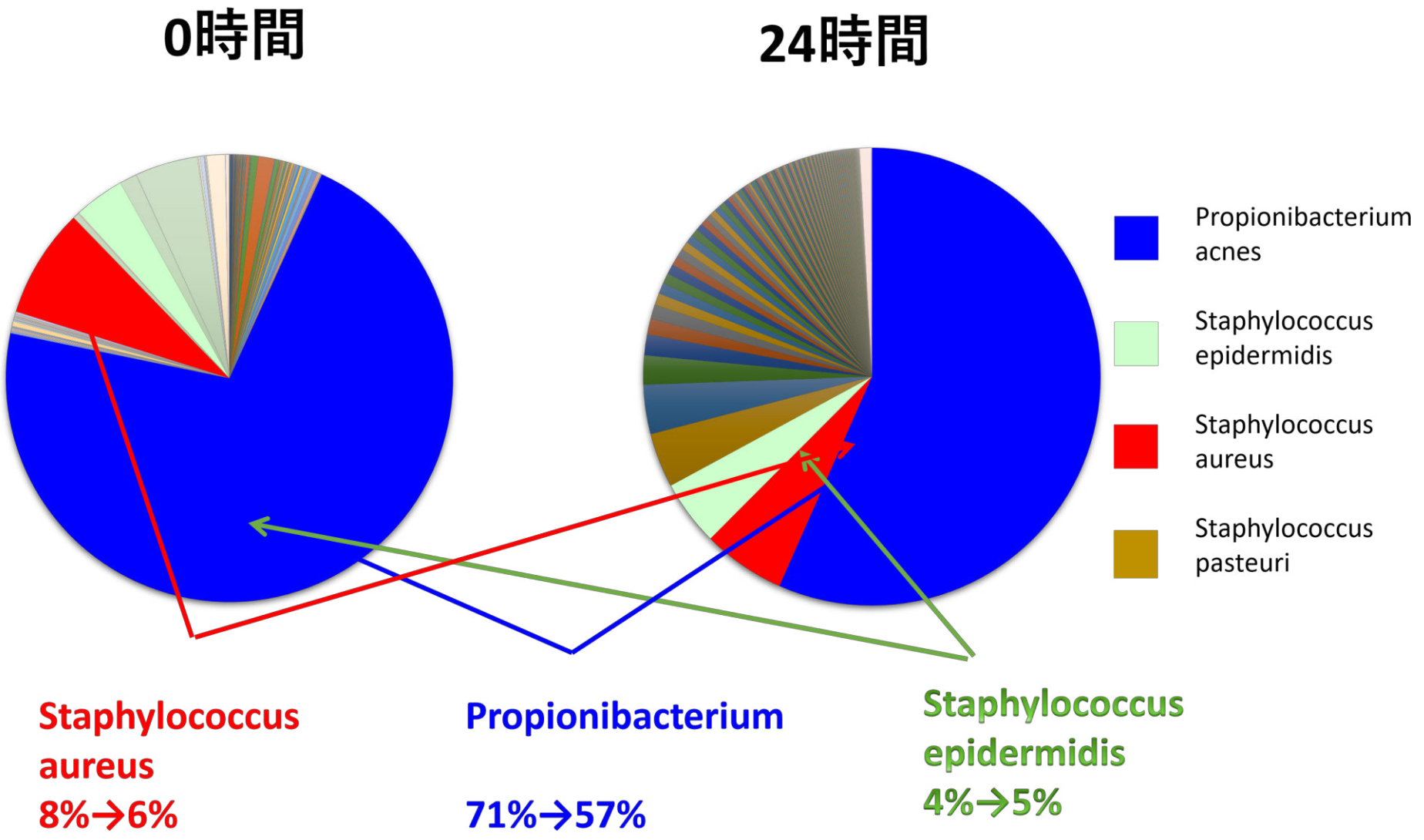
Patient B



Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

acnes

Patient F

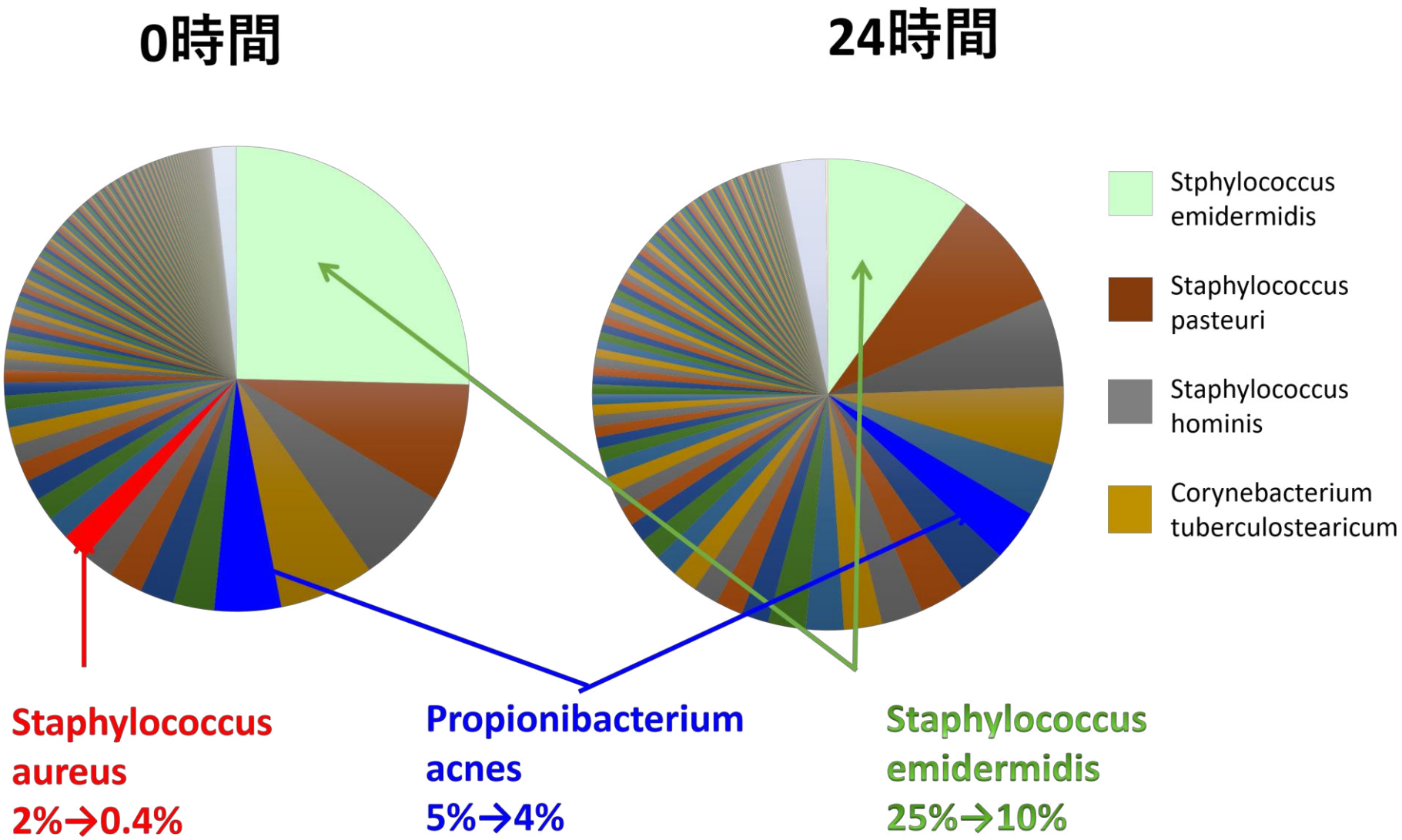

0時間
24時間
Propionibacterium acnes
Staphylococcus epidermidis
Staphylococcus aureus
Staphylococcus pasteuri
Staphylococcus aureus 8%→6%
Propionibacterium 71%→57%
Staphylococcus epidermidis 4%→5%

acnes

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Time-series changes of all strains pie data　ACNE patients

Patient A



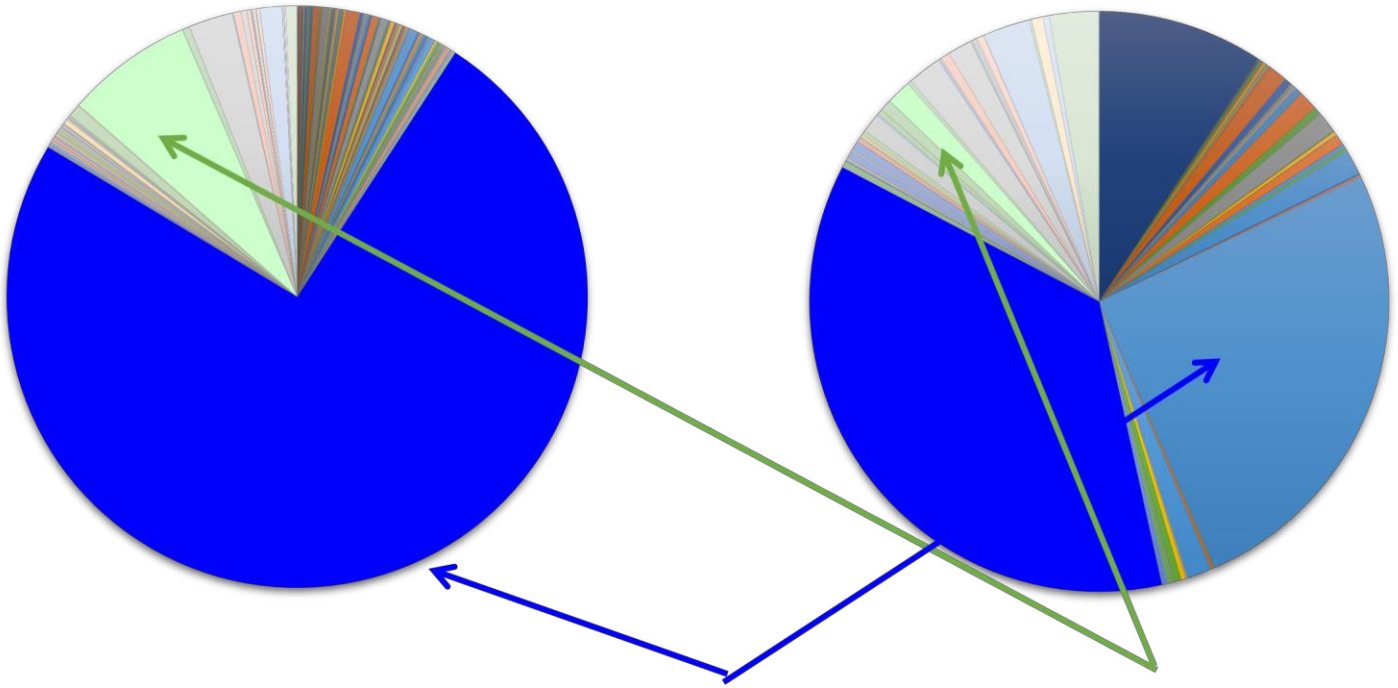
Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Patient E

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

0時間

24時間



Propionibacterium acnes

Staphylococcus epidermidis

Lactobacillus nagelii

Acetobacter fabarum

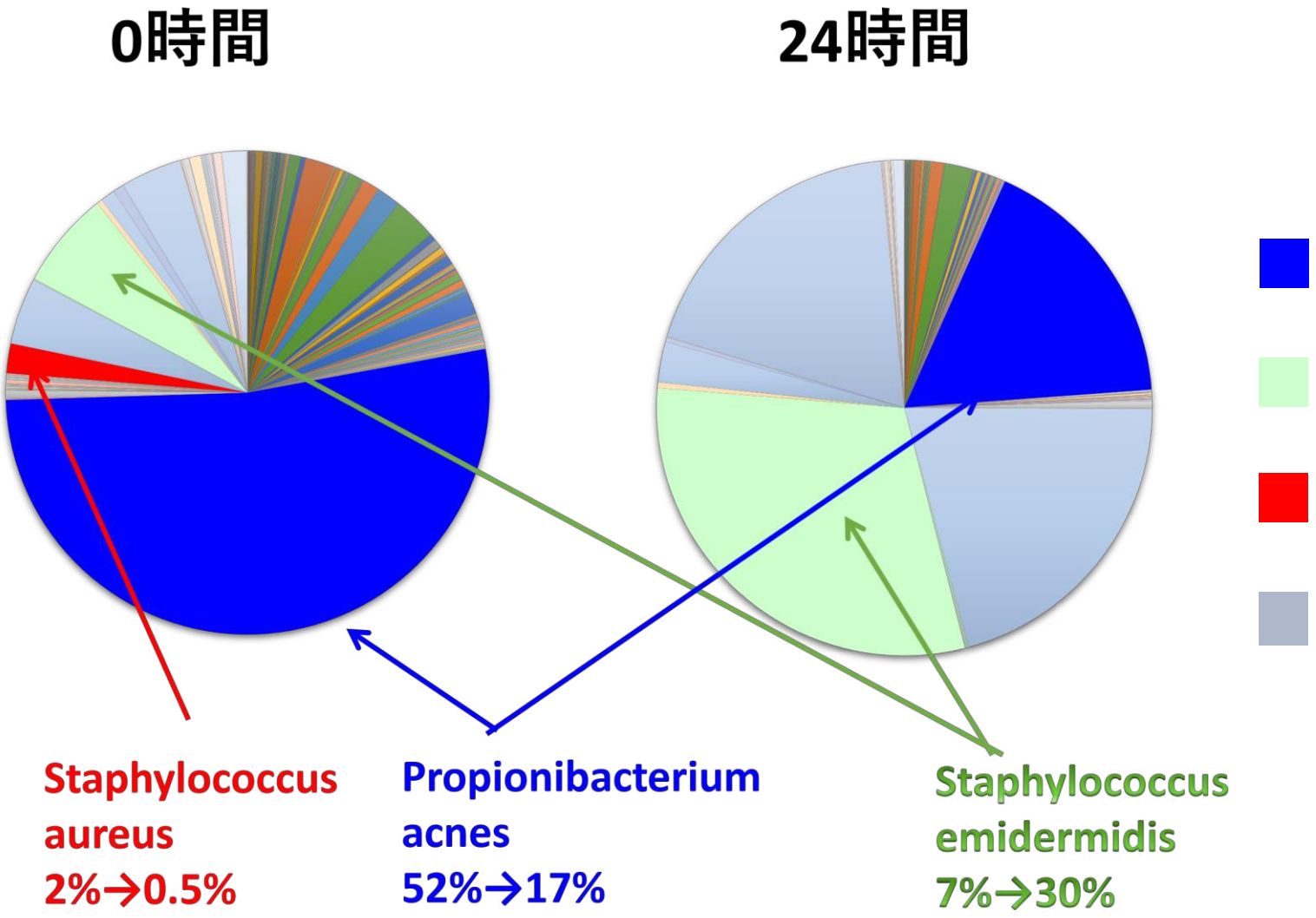
Staphylococcus aureus
0%→0%

Propionibacterium acnes
74%→36%

Staphylococcus emidermidis
7%→1%

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Patient C



Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Propionibacterium acnes

Staphylococcus epidermidis

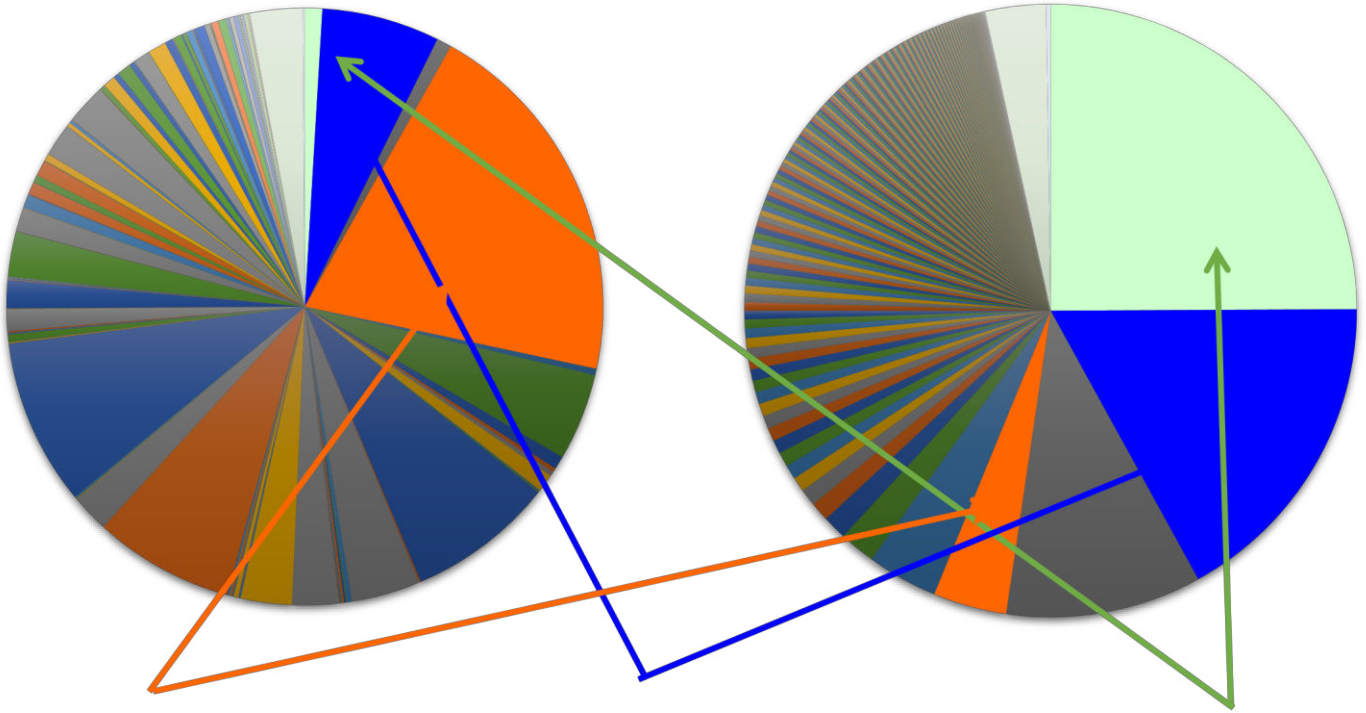
Staphylococcus aureus

Staphylococcus pasteuri

Patient G

0 時間

24 時間



Streptococcus dentisani
20%→4%

Propionibacterium acnes
6%→17%

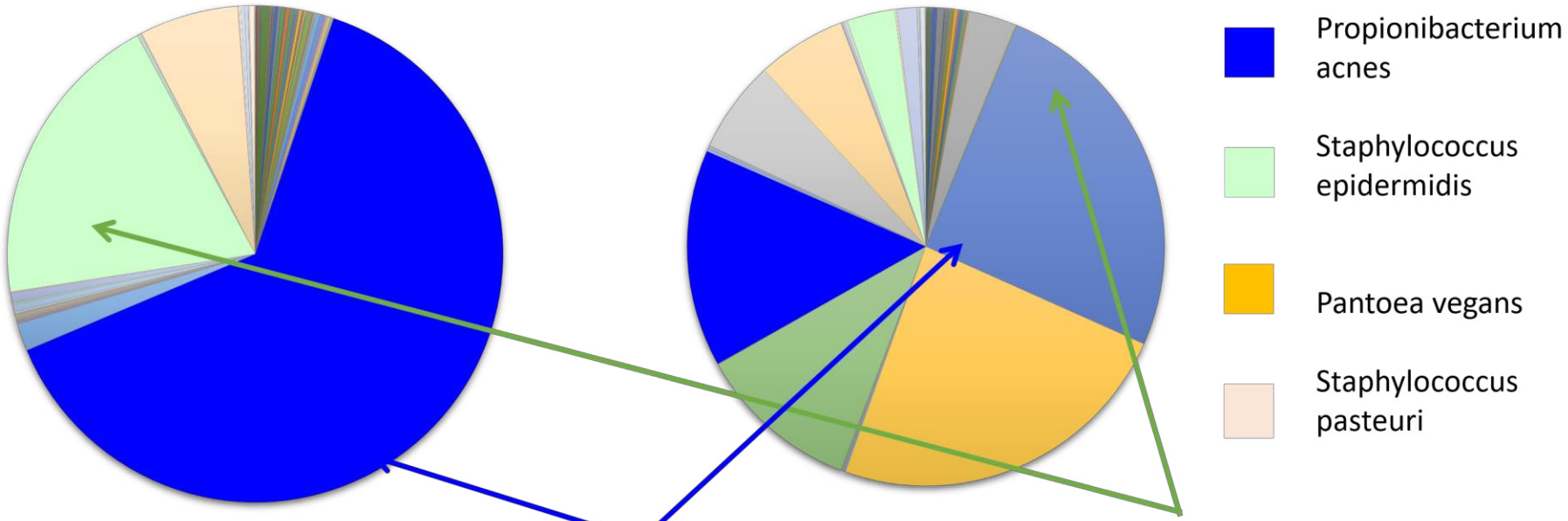
Staphylococcus emidermidis
1%→25%

Chiharu De

Patient D

0 時間

24 時間



Staphylococcus aureus
0%→0%

Propionibacterium acnes
64%→15%

Staphylococcus emidermidis
20%→3%

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe

Other / considerations

-From the subjects who performed skin flora analysis, it can be said that P. acnes and Staphylococcus aureus may be reduced by nitrogen gas plasma treatment, leading to a normal balance of indigenous skin bacteria.(However, it may reduce Staphylococcus epidermidis, so be careful about postoperative dryness.)
(Interesting case: G subject) ・ Group A haemolytic streptococcus, which is a reddish poison, is present in about 25% at 0 hours, and Staphylococcus epidermidis is very few, but after 24 hours, streptococcus is reduced to just over 5%, and staphylococcus is 40. It has increased to just over%. Streptococcus was also found to be sterilizable.
There is a possibility that the number of P. acnes will partially return after 72 hours. This time it was 0.8J / cm treatment, but the decreasing trend is maintained by increasing the fluence. There is a possibility that it will be done (from clinical data

Chiharu Dermatology Clinic, Dr. Chiharu Watanabe