

# Sky after 30 years: a brief biography of three biomedical research chimpanzees in Japan

Satoshi Hirata<sup>1</sup>

<sup>1</sup> Wildlife Research Center, Kyoto University, Kyoto, Japan

## The last three chimpanzees in a biomedical facility in Japan

This year, 2022, is the 10th anniversary of three chimpanzees' move to Kumamoto Sanctuary, Kyoto University. Two of the chimpanzees, Shoubou and Musashi, are males, and the other one, Candy, is a female. Prior to the move, they were subjects of experimental research on hepatitis virus infection, and were kept in a facility belonging to a private biomedical company. They were imported from African forests into Japan between 1980 and 1983. When they were imported, all three of them were young, with estimated ages of between 1 and 5 years. Many other chimpanzees were similarly shipped to Japan for the purpose of biomedical research.

By 1983, about 150 chimpanzees had been imported into Japan for biomedical research. The original purpose of this research was hepatitis B vaccine development, but the focus then shifted to hepatitis C virus research, which was established by a Japanese ministry and involved collaboration between several public and private organizations. Later on, in the late 1990s and early 2000s, there was growing debate among researchers and other interested parties on halting the use of chimpanzees in invasive studies, and as a result, all biomedical research on chimpanzees in Japan stopped in 2006. The private facility of a pharmaceutical company which housed most of the biomedical chimpanzees in Japan at that time turned to Kumamoto Sanctuary in 2011 as a place for the future care of the chimpanzees retired from biomedical research (Morimura et al 2011; Hirata et al. 2020). Shoubou, Musashi, and Candy were the last chimpanzees to remain in the medical research facility of another biomedical company.

Shoubou, Musashi, and Candy were moved from this biomedical company to Kumamoto Sanctuary on 15 May 2013. Up until then, they had been kept in individual cages since their importation into Japan. So they had spent about 30 years alone. The cages were only 1–1.5 m in length, width, and height, respectively; that was the total space they were given to live in. The ceiling, back, and left-hand and right-hand walls of each cage were made of steel plates, and the front comprised a metal grid. The chimpanzees were kept in a laboratory under strictly controlled conditions; there was no sunlight at all.

The staff who cared for these chimpanzees wished for a better place for them, and with the understanding and support of the company, the transfer of the chimpanzees to Kumamoto Sanctuary was realized.

## Sky after 30 years

After the three chimpanzees arrived at Kumamoto Sanctuary, the first step was to habituate them to their new environment. For 30 years, they had never stepped outside their small cages; they had never seen the sun, the sky, or soil; they had never seen trees or felt a breeze. Their skin was as white as snow.

In the wild, chimpanzees can easily climb a 40- to 50-m-high tree, yet the three chimpanzees were unable to climb up onto a small platform. They moved slowly, and they did not run. After arriving at Kumamoto Sanctuary, they were first kept separately, in indoor rooms, to let them exercise to some extent.

Ten days after the move, Candy was let out into the out- door playground on her own (Fig. 1). Unfortunately, it was a cloudy day and the sun was not shining, but it was still the first time in 30 years that Candy had been outdoors, able to see the sky. Candy peeked out of the door to the outside, looked around cautiously, and then retreated back indoors. She did not dare to go outside right away. But after a while, she did, at which time the playground was overgrown with wild plants bearing berries and with other types of plants. After going outside, Candy carefully bent and stacked the plants to make a nest, which resembled the ground nests made by wild chimpanzees.

Candy must have spent time with her mother in the African forest as an infant or young juvenile, before she was captured and sent to Japan. During that time she would have slept with her mother in nests that her mother, or perhaps even she herself, had made at night and during the day. Wild chimpanzees make nests by bending tree branches and herbaceous plants, and Candy seemed to have remembered this aspect of her natural life in Africa.

Day by day, Candy slowly got used to living outdoors. The next step was to put her together with other chimpanzees. A male named Black was the first chimpanzee whom she met (Fig. 2). Black was a gentle chimpanzee who was kind to females, and we expected that he would get along well with Candy. Candy, again, showed no sign of the 30-year behavioral void she had lived through, and greeted Black with an audible chimpanzee-style greeting, “Ha ha ha.” Shortly after, she joined Black and hugged and kissed him. After that, they walked hand in hand, groomed each other and showed a high degree of social interaction.

Captive chimpanzees that grow up alone and isolated from social contacts often fail to develop behaviors appropriate for a chimpanzee. The reason for this is that postnatal experience and learning are necessary for chimpanzees to fully develop normal behaviors such as nest-making and social greetings. Candy withstood 30 years of isolation yet still remembered behaviors that are normal for a chimpanzee.

## Common enemy strategy

The process of integration was a little more difficult for Shoubou and Musashi than for Candy. The reason for this is that wild chimpanzee males do not move from one group to another. In wild chimpanzee society, when females grow up, they leave their natal group and join another group where they integrate with new peers. In contrast, males remain in their natal group for their entire lives. When two unfamiliar chimpanzees meet each other, the encounter can be extremely hostile. At Kumamoto Sanctuary, if Shoubou and Musashi were to live with other chimpanzees, they had to be integrated into an all-male group, due to the sanctuary’s non-breeding policy.

First, Shoubou and Musashi were brought together in the same space. Both of them had been kept at the same medical facility, but had never been together there. Fortunately, in the context of bringing Musashi and Shoubou together, neither was physically strong due to their long periods of isolation in a small cage. Unlike normal, healthy, muscular chimpanzee males, Shoubou and Musashi apparently did not have the strength to inflict fatal injuries on each other. Nothing serious was therefore expected to happen, although the sanctuary personnel remained on alert, ready to intervene if necessary.

In fact, the encounter progressed as expected. The two chimpanzees went out to the playground together and at first were rather hostile towards each other. However, the hostility resembled more a fight between infants than between adult males. After a short period of agonistic interaction, both Shoubou and Mousasi appeared fatigued; they moved away from each other, and did not interact further. About 1 h after they first came together in the playground, they returned to their individual rooms. These encounters, lasting from 30 min to 1 h each time, were repeated every day for about 1 week, but the social distance between the males did not change.

As a next step, a “common enemy” strategy was implemented to make the chimpanzees become friendlier with each other. This involved showing Shoubou and Mousasi a different chimpanzee. The hoped-for scenario was that Shoubou and Mousasi would become allies when confronted with what they might perceive as a common enemy. A chimpanzee named Shirou was selected for this role.

Shirou was brought into a playground adjacent to the one in which Musashi and Shoubou were together. There was an open space and a wire mesh between the playgrounds, so that the Musashi and Shoubou could not come into physical contact with Shirou, but they could see and hear each other clearly. When Shoubou and Musashi saw Shirou, they instantly showed a “scared” facial expression, approached each other and hugged (Fig. 3). From that moment on, the physical distance between Shoubou and Musashi decreased, and they started to interact in various ways during the following 30 min until they were taken back to their rooms. Thus the common enemy strategy was a success. This strategy was also used on the next day, for about 30 min, and resulted in a strengthening of the affiliation between Musashi and Shoubou. In human society, politicians sometimes use the common enemy strategy to redirect domestic dissatisfaction towards a foreign country and to increase domestic cohesion. Humans and chimpanzees may show similar psychological responses to this strategy.

There was another reason why Shirou was selected as the common enemy. Like chimpanzees everywhere, those at Kumamoto Sanctuary show a wide variety of individual behavioral characteristics, and compared to the other male chimpanzees, Shirou was a very “moderate” chimpanzee. Based on how they observed each other through the wire mesh for extended periods of time, Shoubou and Shirou seemed to become friendly, so they were put together. They did not get along well at first: Shoubou suddenly grabbed Shirou and they fought. But the moderate Shirou did not fight back too hard and continued to solicit amicability from Shoubou. Eventually Shoubou changed his attitude and the two chimpanzees embraced.

It would take too long to explain in detail what happened after that, but the introduction of Shoubou and Musashi to other chimpanzees proceeded gradually, and took into account each chimpanzee’s personality and social compatibility. Through this process, Shoubou and Musashi gradually acquired the social skills required to live in a group with other chimpanzees.

## **The retired chimpanzees’ present and future**

The three chimpanzees described here have become muscular and their skin has become black as a result of spending much of the time outdoors with their group members. Candy’s first male companion Black passed away in 2020, and she is now a member of a different group with one male and eight females. The sanctuary’s management strategy includes some changes in group membership day to day, to simulate the fission–fusion society of wild chimpanzee groups. Candy is skilled at interacting with males and looks calm, but once she gets excited, she persistently shows she is displeased with other females. I think she is enjoying her social life as a chimpanzee, with some confrontation and peace-making with other group members every day.

Shoubou and Musashi are members of an all-male group of 13 individuals. This group is divided into a two sub-groups with varying membership that mimics fission–fusion, as with Candy’s group. Shoubou likes to play with other males and engages in grooming with everybody in his group. He loves food and has no inhibitions. One day, without showing any hesitation, he grabbed a sugarcane that another male was holding. Astonished by this rude behavior, the latter released his hold on the sugarcane. Musashi has become stronger and has well-developed lower body muscles. Every morning he runs into the outdoor enclosure and rampages around. Other males bigger than Musashi are sometimes annoyed by him and his peculiar way of attacking others suddenly from behind without making a sound. Shoubou and Musashi do not appear to have a close social bond, as they do not usually stay close to each other; however, when one of them gets involved in a fight, the other goes to help. Thus they seem to have an enduring, though often invisible bond, established during their earlier days at Kumamoto Sanctuary. Candy, Shoubou, and Musashi were all experimentally infected with the hepatitis C virus (HCV), and they currently have high levels of HCV in their body. At the time of writing this article, five other chimpanzees at Kumamoto Sanctuary have become chronic carriers of HCV as a result of their previous use in biomedical experiments. These chimpanzee carriers of HCV generally show high serum levels of glutamic oxaloacetic transaminase, glutamate-pyruvate transaminase, and gamma-glutamyl transpeptidase, which indicate some degree of liver damage. Three of them (females Susumu, Kumiko and Akina) tend to bleed persistently if they are wounded, show hypermenorrhea, or unexplained epistaxis; they are also considered to be symptomatic for their HCV infection, which causes problems with hematopoiesis. Special attention is paid to the care of these chimpanzees, including continuous drug administration to mitigate their symptoms.

The use of chimpanzees for invasive biomedical research in Japan started in 1974 and ended in 2006. However, the end of biomedical research is not the end of the matter, as there are living chimpanzee HCV carriers who need special care, as described above. Invasive biomedical studies on chimpanzees have also been conducted in other countries, not just in

Japan. Thus, I assume that similar issues to those discussed here will arise when retired chimpanzees are housed in those countries (Grimm 2017). Future collaboration among experts around the world will allow us to identify the issues that need to be addressed and to consider how we can provide the best care for these deserving chimpanzees.

## References

Grimm D (2017) Chimps in waiting. *Science* 356:1114–1117

Hirata S, Morimura N, Watanuki K, Ross SR (2020) The establishment of sanctuaries for former laboratory chimpanzees: challenges, successes, and cross-cultural context. In: Hopper LM, Ross SR (eds) *Chimpanzees in context: a comparative perspective on chimpanzee behavior, cognition, conservation, and welfare*. University of Chicago Press, Chicago, pp 208–230

Morimura N, Idani G, Matsuzawa T (2011) The first chimpanzee sanctuary in Japan: an attempt to care for the “surplus” of biomedical research. *Am J Primatol* 73:226–232



Fig. 1 Candy, outside, seeing the sky for the first time in 30 years



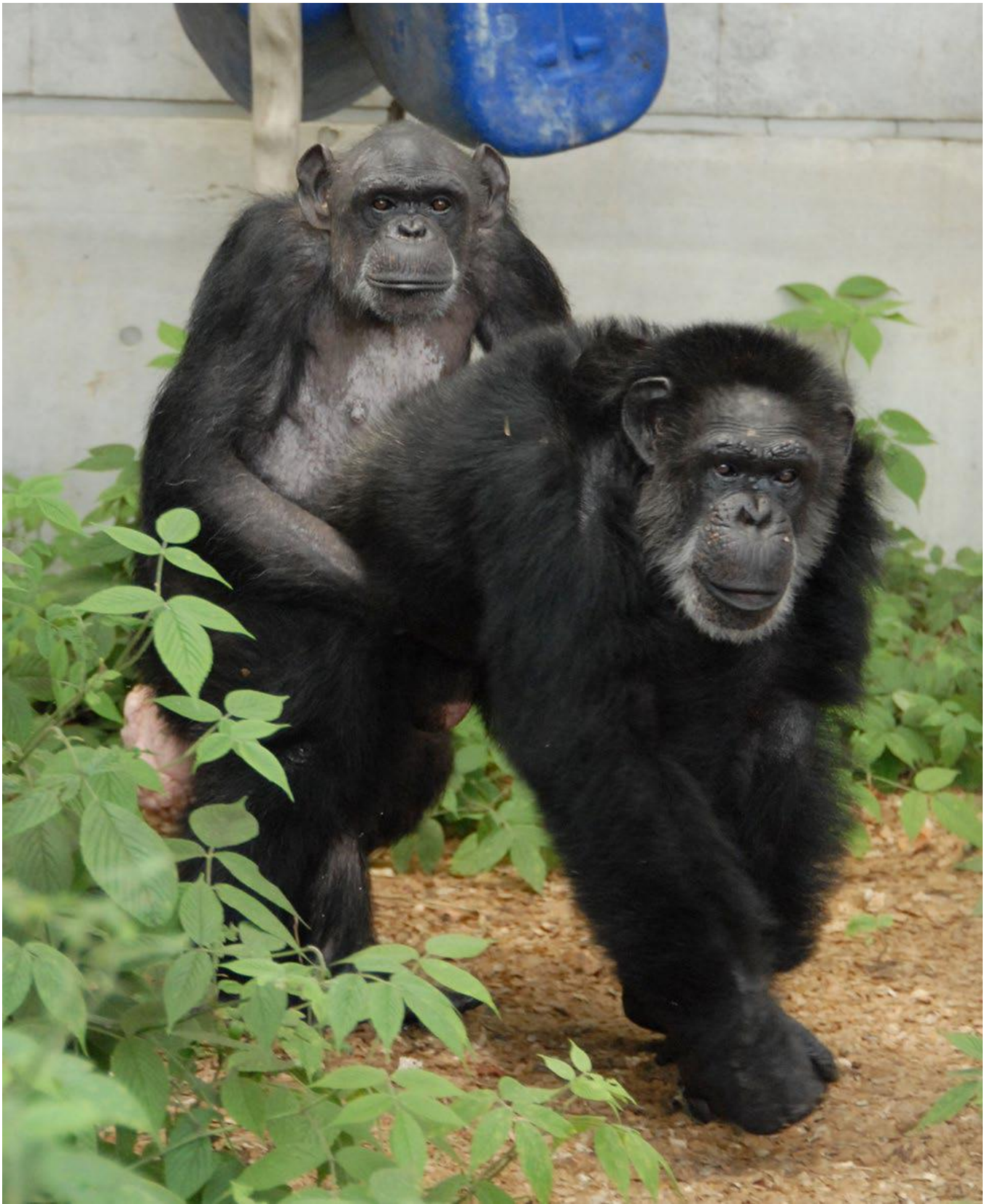


Fig. 2 Candy embracing Black from behind





Fig. 3 Musashi (behind) and Shoubou (in front) scared by their “common enemy” beyond the wire mesh