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Leukemia in Nagasaki

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I would like to speak about two comments of the adult leukemia in Nagasaki. One is the leukemia of atomic bomb survivors. It is important as a case of radiation induced human leukemia. Among the atomic bomb survivors, the incidence of all types of leukemia except CLL and ATL increased.

CLL and ATL are the leukemia of peripheral B or T lymphocytes. Other types of leukemia which showed significant increase among atomic bomb survivors are now generally thought to have originated in the hemopoietic stem cells.

A highest point of in the number of these leukemia was observed 6 years after the bomb, and then gradually decreased. Even now, we can see few cases acute leukemia in heavily exposed survivors. Among them, CML is most characteristic in the case of atomic bomb radiation induced leukemia. CML in atomic bomb survivors appeared in the younger age group most clearly in the early stage after the bomb.

CML cells have a characteristic chromosome abnormality named Ph¹, and Ph¹ chromosome can be seen all blood cell series (granulocyte, red cell, and megakaryocyte). Therefore, CML is thought to be hemopoietic stem cell disease. And, all CML among A-Bomb survivors which was tested about chromosome study showed Ph¹ positive.

I think that the atomic bomb radiation initially affected the hemopoietic stem cells in the mechanism of radiation induced leukemogenesis, according to the respect of occurrence of the leukemia in the atomic bomb survivors.

We can find chromosome abnormalities in the significantly increased number in the cells derived from hemopoietic colonies of healthy

highly exposed atomic bomb survivors, even now.

Second comment ; Nagasaki is one of the endemic area of ATL (Adult T-cell leukemia) in Japan. Recently, ATL has been attended as the virus induced human leukemia and lymphoma, in the world. This ATL virus is named HTLV-I. This virus is c-type retro virus. In the serum of almost all patients with ATL, we have demonstrated positive anti HTLV-I antibody. We can find antigen in the cells of ATL patients by several days cell culture by indirect immunofluorescence method and we can see virus particles by electron microscope. And in the cells of ATL, the monoclonal integration of provirus DNA of HTLV-I have been demonstrated. In this area, T-cell ML, CTL, T-CLL also show positive proofs of HTLV-I infection in high percentage.

Common type of ATL have a leukocytosis with lymphocytes having characteristic intended nuclei, generalized lymphadenopathy, immunodeficiency due to T-cell dysfunction, hypercalcemia and various skin involvement. The opportunistic infections are very common.

The prognosis of ATL is usually very poor. ATL cells is usually have a phenotype of OKT4 helper cell, but have a suppressor function for immunoglobulin production of B-cells.

We have experienced very strong familiar disposition, and we have demonstrated the establishment of virus infection due to mothers' milk and blood transfusion. In Nagasaki, there are many healthy carriers of this virus. Positive rate of anti HTLV-I antibody in the healthy adults are 5-30%.

I think, ATL is very important disease to clarify the developmental mechanism of virus induced human malignancies.