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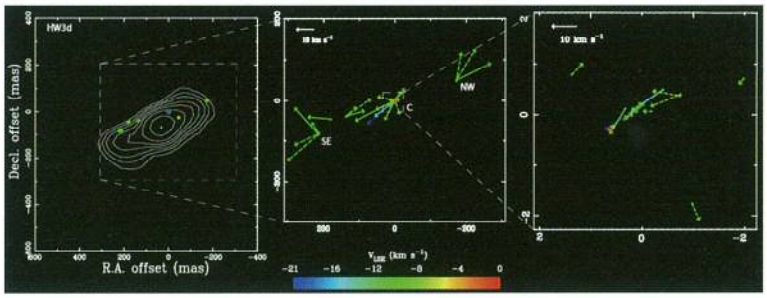
Professor awarded ¥300 million funding for gene therapy research from the Ministry of Health, Labour and Welfare

In recent years, the development of gene therapy has become pressing for cancer treatment. However, the method of transducing therapeutic genes into cancer cells using replicationdefective viral vectors was not producing the results everyone had at first hoped for. To overcome these problems, the vectors were replicated in the cancer cells alone, leading to the development of treatment using a cancer-killing oncolytic virus, clinical trials of which are being carried out chiefly in the United States. Professor Kosai Kenichirō, (Department of Gene Therapy and Regenerative Medicine, Graduate School of Medical and Dental Sciences) is the first in Japan to develop and patent the next generation of oncolytic virus, a conditionally-replicating adenovirus with multiple tumourspecific factors (m-CRA), which has improved its therapeutic effects and safety.

PhD student finds evidence of birth of giant star



Chibueze James Okwe's research in the Department of Physics & Astronomy, Graduate School of Science & Engineering focuses on how giant (massive) stars are formed. The Sun is a star, and to give an idea of its size, it can swallow 1 million Earths, yet in astronomy we refer to it as a yellow dwarf because of its relatively small size. Giant stars are stars that are 8 or more times bigger that the Sun. Such massive stars form in a slightly different way compared to their low-mass counterparts like the Sun.

Stars are generally made up of gas and dust. High-mass stars form in regions in space where there is a huge amount of gas and dust, known as dense molecular clouds. One of these, Cepheus A, is a massive starforming region. In simple terms, using an observational technique called very long baseline interferometry (VLBI), which involves using multiple radio telescopes to observe the same source simultaneously, James investigates the motion of the materials and physical conditions around the forming giant star. Tracing such motion provides us with useful clues on how high-mass stars form. This can be done by monitoring star formation indicators called masers.

Masers (microwave amplification by stimulated emission of radiation) are the simply microwave equivalent of lasers (light). James observed the relative change in the position of masers that are emitted at the frequency of 22 GHz, called water masers, in Cepheus A and successfully traced the relative motion of the maser features associated with HW3d (one of the objects in Cepheus A). As can be seen in the figure, the solid and dashed arrow lines represent the motion (velocity) and direction of each of the water maser features. This is an indication of how materials move in the region. Water masers in HW3d are seen to be moving away from the two opposite sides of the center of the object represented by the white contour. These are outflows from the two poles of the central star in HW3d, usually called bipolar outflow.

This discovery by James is the first ever convincing evidence of the present of a very young giant star, more than 10 times the mass of the Sun, in HW3d of Cepheus A. Details can be found in Chibueze et al. 2012, The Astrophysical Journal, 748, 146.