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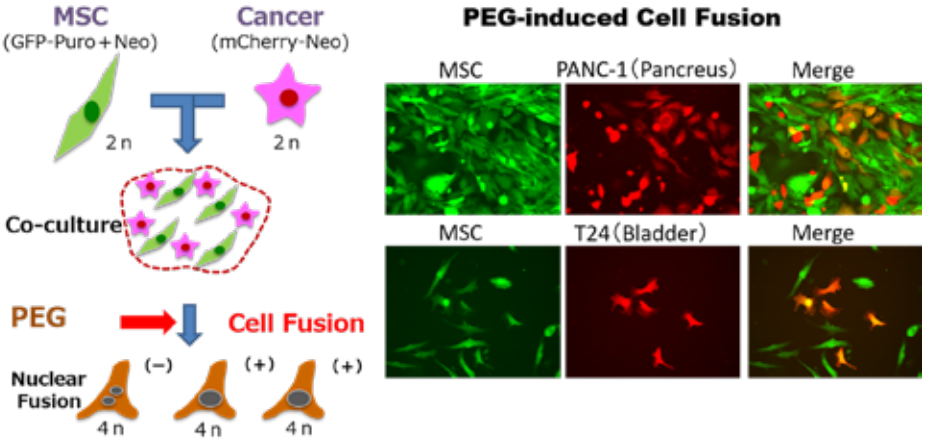
Project Leader **Futoshi Shibasaki** Molecular Medical Research Project

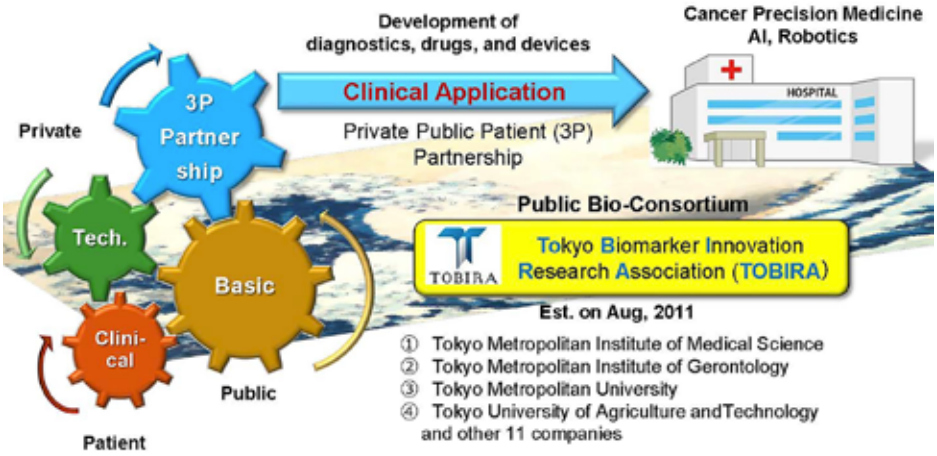
Translational Research for Cancer and Infectious Diseases: Basic to Applied Science

Recent discoveries of biomarkers and novel technologies have opened the new aspects of the mechanisms and drug developments especially in cancer and infectious diseases. In basic research, we have been focusing on the mechanisms of cancer angiogenesis and the drug development using siRNA, and on malignant transformation and metastasis caused by cell fusion. In addition, the novel mechanisms for H5 influenza virus entrance into cell surface would be a drug target.



In clinical and translational research, we focus on the establishment of platform to perform "Precision Medicine" by Whole genome analysis with next generation sequence in collaboration with Metropolitan Hospitals. For Private Public Partnership (3P), we have already established the Bio-Consortium "Tokyo Biomarker Innovation Research Association" (TOBIRA).

Our specific aims are to perform the basic science and be to develop the new findings to the translational research.

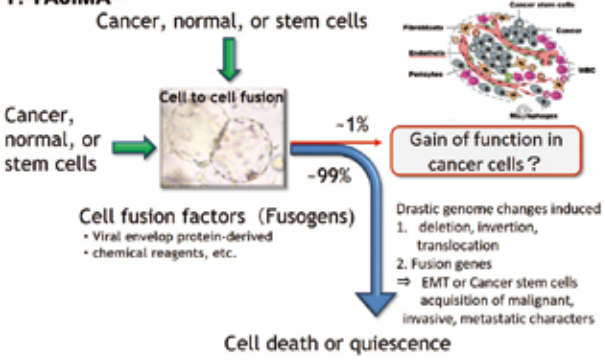


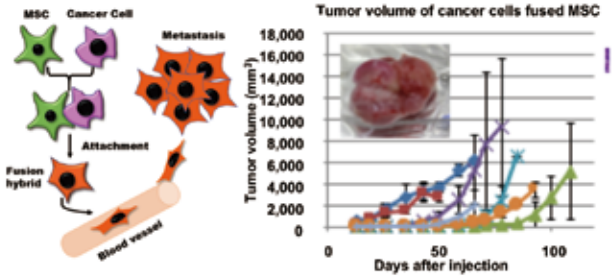
Molecular Medical Research

Malignant cancer progression after cell fusion with stem cells

Y. TAJIMA

Cancer cells fused with mesenchymal stem cell (MSC) in the micro-environment, changes the original character, and often promote dormant, malignant, or metastatic tendency.





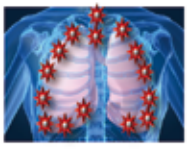
Fused cancer/MSCs promote metastasis than originals

Development of drugs for highly pathogenic H5N1 influenza viruses

N. KAJIWARA

H5N1 has multiple basic amino acids at HA cleavage site.

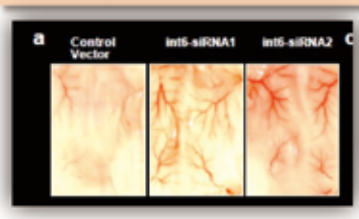
H1N1 Cleavage site
KYVRSTKLRMVTGLRNIPSIQYR----/GLF
H3N2
KYVKQNTLKLATGMRNVPEKQTR----/GLF
H5N1
HA KYVKSNRLVLATGLRNSPQRERRRKKR/GLF

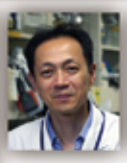


H5N1 highly pathogenic avian influenza virus causes severe pneumonia and multiple organ failure. The mortality rate is about 60%.

We focus on the mechanism of basic amino acid sequence of the split region for discovering new model of the virus entry. The goal of our research is to provide new insights into the molecular mechanism of highly pathogenic avian influenza (H5N1) infection as well as the development of novel antiviral drugs.

Drug development of Int6-siRNA



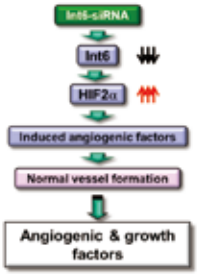


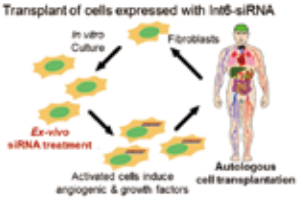
A. IRIE

S. GOTO

Int6 is a key factor to negatively regulate HIF2α-induced angiogenesis and cell protection. The specific siRNA against *int6* would be a possible candidate for cell therapy to treat emic diseases of heart, brain, lower limb, and degenerative and atrophic diseases.

Cell Therapy with *Ex vivo*-siRNA treated Cells





for Ischemia, Degeneration, Atrophy

Diagnostics and device development through Private Public Patient Partnership

Fluoro-IC Chip & Reader

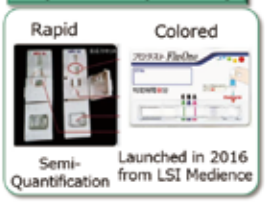
IC Reader

With high sensitive fluoro-beads <15 min, >100 folds sensitive

① **Seasonal A, B Influ IC** PMDA-approved in 2014 (100 fold higher sensitivity)

② **H5N1 Avian Influ IC** under development

Rapid & Easy IC Chip

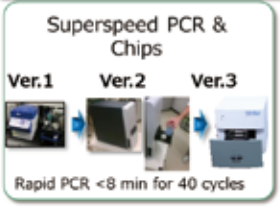


① **Kits for detecting neutralizing Ab in Fabry**

② **Seasonal A, B Influ color IC** PMDA Approved in 2014 Now on sale

③ **Kits for Cervical Cancer (Plan for sale in 2018)**

Rapid Gene Amp. Devices



We aim to develop a rapid and handy device to amplify the target DNAs and RNAs for diagnosis of infectious diseases and cancers.

Molecular Medical Research