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Simon J. Boulton, PhD, FMedSci, is head of the DNA Damage Response Lab and a Senior Research Scientist at Cancer Research UK.

His research is focused on DNA repair and the discovery of genes and proteins that play an important role in maintaining the integrity of the genome. This field is important for cancer research, because when errors in the genetic code are not repaired, they can lead to cell damage — including the uncontrolled cell growth that characterizes cancer.

One project has focused on the characterization of an enzyme called RTEL1, which regulates homologous recombination — one way in which DNA damage is repaired and genetic information is exchanged during meiotic cell division. He also found how another enzyme called HELQ1 promotes homologous recombination during the repair of DNA damage.

Other research has focused on the protein ALC1, which is required for DNA repair and that, when overproduced, has been associated with more than half of all primary liver cancers. Dr. Boulton has also studied ways in which certain defects in mitochondria, the “power plants” that provide energy to cells, can lead to genomic instability. Dr. Boulton earned his PhD degree from the University of Cambridge.

[Simon J. Boulton's webpage at Cancer Research UK partner The Francis Crick Institute.](#)

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## Levi A. Garraway

Levi A. Garraway, MD, PhD, is co-leader of the Cancer Genetics Program at Dana-Farber/Harvard Cancer Center, an Associate Professor at Harvard Medical School, and a Senior Associate Member at the Broad Institute of MIT and Harvard.

Dr. Garraway's research is focused on three main areas. The first is the discovery of new cancer genes that are relevant across

many different types of cancer. This work has led to the identification of several new cancer genes that drive melanoma, prostate cancer, and other malignancies. An unexpected recent outcome of this work involved the discovery of cancer-causing mutations in what is known as the “dark matter” of the genome — DNA that does not code for proteins but plays a role in gene regulation.

Another area of focus is studying how additional genetic or molecular changes enable tumors to develop resistance to targeted therapies, especially in melanoma. His work identified a novel mechanism for how mutations that confer resistance to drugs that inhibit the proteins MEK and RAF arise. The third area is adapting genomic technology to enable its use by clinicians to develop better cancer treatments. Dr. Garraway earned his MD degree from Harvard Medical School and his PhD degree from Harvard Graduate School of Arts and Sciences.

[Levi A. Garraway's webpage at Harvard Medical School](#)

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## Duojia (DJ) Pan

Duojia (DJ) Pan, PhD, is a Professor of Molecular Biology and Genetics at Johns Hopkins University School of Medicine and a Howard Hughes Medical Institute (HHMI) investigator.

His most important accomplishment is the discovery of the Hippo signaling pathway, a central mechanism that regulates tissue growth in animals ranging from insects to humans.

Using the fruit fly *Drosophila* as a model system, his laboratory made a series of discoveries that allowed them to decode, in a stepwise manner, the key molecular events in the Hippo pathway. Their research further established a critical role for the Hippo pathway in controlling organ size and tumorigenesis in mammals. By studying the mechanisms and genes that regulate tissue growth in normal development, he hopes to better understand why and how mutations of certain genes lead to cancer. This information, in turn, can guide efforts in developing cancer therapeutics.

Dr. Pan's current work is focused on understanding the physiological signals that control the Hippo pathway during normal development. He also would like to discover chemicals that can be used to manipulate the pathway. Dr. Pan earned his PhD from the University of California, Los Angeles.

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