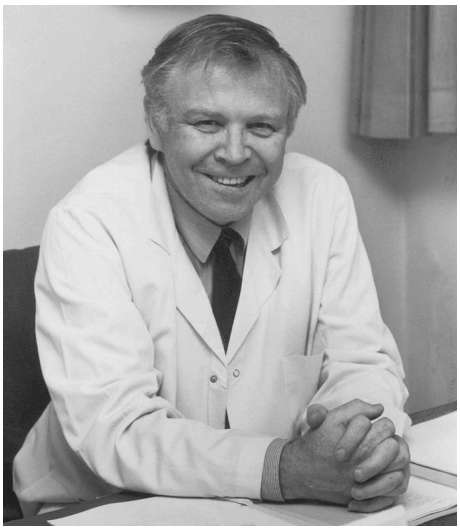
UNIVERSITY OF BERGEN

DEPARTMENT OF MOLECULAR BIOLOGY

Department of Molecular Biology honours the memory and legacy of Professor Kjell Kleppe (1934-1988) one of our unsung heroes of molecular biology, and the one who amplified DNA 20 years before PCR.



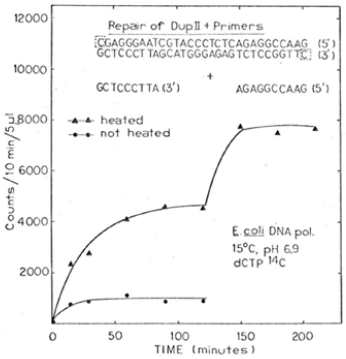
"Professor Kjell Kleppe (1934-1988) - Biochemist, genetic engineer and pioneer"

with presentations from

Professors Lars Haarr, Johan R. Lillehaug and Dag E. Helland

"Egget" @ Studentsenteret

Thursday Nov 10th at 15:15



Kjell Kleppe, Gordon Conference on Nucleic Acids, June 18th, 1969 (Fig 11)

"Single-cell RNA sequencing: A modern microscope"

Horizons Lecture* and *Inaugural Kjell Kleppe-Lecture

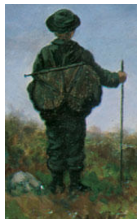
by Professor Rickard Sandberg

Karolinska Institutet, Stockholm

"Egget" @ Studentsenteret

Thursday Nov 10th at 16:15

*Refreshments are served from **16:00***



"Analyses of allelic gene expression in single cells"

Research Lecture

by Professor Rickard Sandberg

Karolinska Institutet, Stockholm

MBI seminar room – N-terminal

Thursday Nov 10th at 11:00

More information at: **http://tinyurl.com/kjell-kleppe**

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DEPARTMENT OF MOLECULAR BIOLOGY

Department of Molecular Biology honours the memory and legacy of Professor Kjell Kleppe (1934-1988)

*Professor **Kjell Kleppe** (1934-1988) was a chemist, biochemist, and molecular biologist, and one of the Norwegian pioneers of genetic engineering. Professor Kleppe is most known for his pre-PCR experiments with DNA amplification while working with the Nobel laureate Gobind Khorana in the late 1960ies. As professor at the Department of Biochemistry, University of Bergen, he led an internationally recognised research group on DNA repair and he spearheaded establishment of genetic engineering and modern molecular biology in Bergen and Norway. Thanks to professor Kleppe, Bergen got its High Technology Centre (HIB). With the Annual Kjell Kleppe Lecture, Department of Molecular Biology wishes to honor the memory and legacy of one of our unsung heroes. We are proud to announce Professor Rickard Sandberg, Karolinska Institute, Stockholm, a pioneer of single-cell sequenceing, as the Inaugural Kjell Kleppe Lecturer, a lecture jointly hosted by the Horizons Lecture series.*

"Single-cell RNA sequencing: A modern microscope"

Horizons Lecture* and *Inaugural Kjell Kleppe-Lecture

by Professor Rickard Sandberg, *Karolinska Institutet, Stockholm*

"Egget" @ Studentsenteret **Thursday Nov 10th at 16:15**

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Recent advances in molecular analyses of individual cells are transforming modern biology and medicine. In a high-throughput and cost-effective manner, cells of any organ or tissue can nowadays be subjected to detailed molecular characterization that will identify the activity levels of genes within each cell. The molecular profiles of cells enables researchers to group cells into cell types and further characterize their activity states or identify novel sub-types. Single-cell RNA-sequencing is becoming the modern microscope where molecular insights into the unique activities of different cell types will be gained. It has now become realistic to identify all the cell types in various tissues (and even our whole body) and to map out how these cells are affected in pathological tissues. In this seminar I will describe the advances in our abilities to study gene activities in individual cells, and exemplify new insights in biology and medicine gained from such analyses, as well as discuss future developments and applications of this exciting technology.

"Analyses of allelic gene expression in single cells"

Research Lecture by Professor Rickard Sandberg, *Karolinska Institutet, Stockholm*

MBI seminar room – N-terminal **Thursday Nov 10th at 11:00**

Assessing gene expression in individual cells holds promise to reveal the extent, function and origins of cell-to-cell variability. To this end, my lab has been developing single-cell RNA-sequencing methods (e.g. Smart-seq2), and using the full-length feature of Smart-seq2 together with the detection of heterozygous SNPs we have investigated gene expression at allelic resolution. Analyses across thousands of individual cells revealed fundamental features of allelic expression from autosomes and sex chromosomes. In early embryonic development, female mouse and human embryos achieve dosage compensation of X-chromosome RNA levels using surprisingly different strategies. In mouse, the paternal X chromosome becomes inactivated in 4-cell embryos whereas dosage compensation in human embryos proceeds with a dampening of expression from both X chromosomes. Single-cell analyses of allelic expression of autosomal genes revealed that for a substantial fraction of genes in a cell, the transcribed RNA is derived from only one parental allele. The expression of alleles in a cell was seemingly random, and dynamic over time, even within cells of clonal origins. The allelic resolution was also used to examine other forms of transcriptional and post-transcriptional regulation of protein coding and long non-coding RNAs, demonstrating the power and general utility of allelic resolution single-cell RNA-sequencing to study gene regulation.

More information at: **http://tinyurl.com/kjell-kleppe**