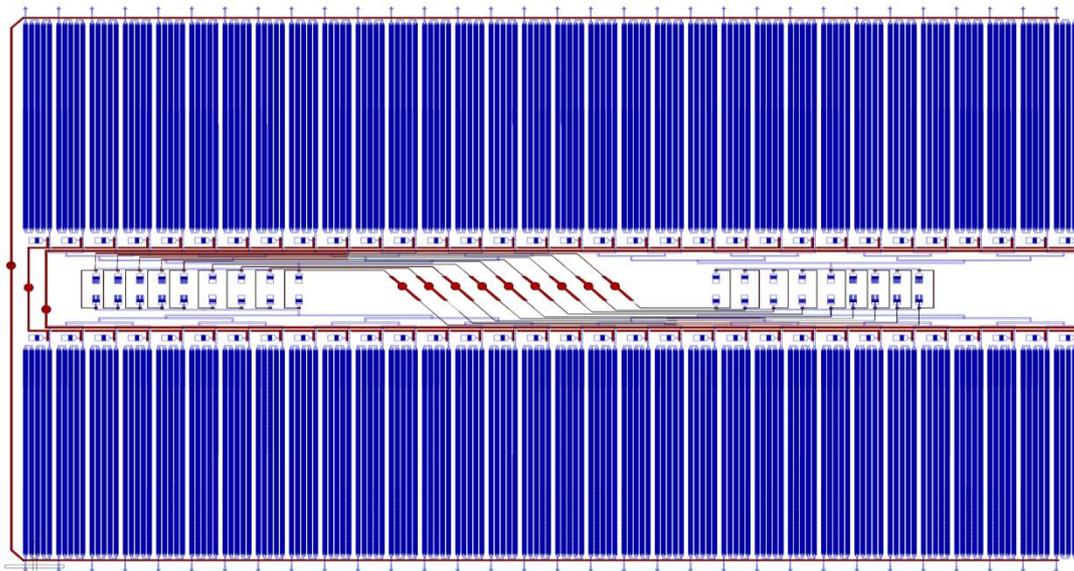


# System for automated immunoprecipitation of protein-DNA complexes



Schematic view of the integrated microfluidic device.

Ref. Nr	6.1814
Keywords	ChIP-seq Chromatin immunoprecipitation Microfluidics Gene regulation Epigenetics
Intellectual Property	Priority 13.12.2017 PCT/IB2017/057889
Publication	WO2019/116306
Date	05/09/2019

## Description and advantages

ChIP-seq is a widely adopted method to study protein-DNA interactions in vivo. However, current protocols are long (more than two days), manually intensive and present numerous limitations such as low sensitivity or throughput. In the last decade, several attempts have been made to improve ChIP-seq but the latter were only able to tackle a subset of these limitations.

FloChIP is an all-in-one automated microfluidic device that consists of several antibody units and microfluidic channels, and includes multi-layered assemblies of biochemical species, together forming a biofunctionalized surface able to capture the target molecule.

## Advantages

FloChIP tackles all the major limitations cited above.

It drastically increases sensitivity by reducing the required cellular material from millions of cells down to only a few hundred. It increases throughput by allowing

multiplexed parallel experiments (antibody or sample) within just a few hours. Moreover, its modular configuration effectively enables straightforward re-immunoprecipitation of eluted chromatin using pairwise interconnect IP lanes, providing a highly sensitive alternative to sequential-ChIP for bivalent chromatin probing.

Additionally, its efficiency was demonstrated for the capture of transcription factor-DNA complexes, whereas most current methods only work for histone marks. Eventually, eluted DNA is tagged directly on-chip, thus decreasing downstream library preparation time.

## Applications

- Study of gene regulatory and epigenetic processes in vivo
- Study of variation-driven phenotypic diversity and disease susceptibility
- Disease diagnostics based on epigenomic signatures