

Ivano Legnini

Curriculum Vitae

Part I – General Information

Full Name	Ivano Legnini
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Part II – Education

Type	Year	Institution	Notes (Degree, Experience,...)
University graduation	2010	Sapienza University of Rome	Bachelor degree in Biological Sciences, 110/110 with honors
University graduation	2012	Sapienza University of Rome	Master degree in Genetics and Molecular Biology, 110/110 with honors
PhD	2016	Sapienza University of Rome	PhD in Genetics and Molecular Biology, with honors

Part III – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
01.11.2015	31.10.2016	Sapienza University of Rome	Assegno di ricerca
01.03.2017	28.02.2019	Max Delbrück Center for Molecular Medicine in the Helmholtz Association	EMBO long term fellowship
01.03.2019	current	Max Delbrück Center for Molecular Medicine in the Helmholtz Association	Researcher

Part IV – Teaching experience

Year	Institution	Lecture/Course
2015/2016	Sapienza University of Rome	Seminar series of model systems in biology: cell culture and manipulations – Superior School for Advanced Studies
2014/2015	Sapienza University of Rome	Seminar in computational approaches for molecular biology, course of “Regulation of gene expression in eukaryotes” by Prof. Irene Bozzoni, Master in Biophysics and Master in Genetics and Molecular Biology, Sapienza University

Part V - Society memberships, Awards and Honors

Year	Title
2017	EMBO long term fellowship
2016	“Chiara D’Onofrio giovani award” (Società Italiana Biofisica e Biologia Molecolare e Fondazione Chiara D’Onofrio)
2015	Laureate of the year award - Sapienza University of Rome
2014	EMBO short term fellowship
2011	Giovanni Armenise Harvard Foundation summer fellowship

Part VI - Funding Information [grants as PI-principal investigator or I-investigator]

As PI:

Year	Title	Program	Grant value
2013	Biosynthesis and turnover of microRNAs (C26N13J54T).	“Avvio alla ricerca” (starter grant for undergraduate students), Sapienza University of Rome	

As participant to the project:

Year	Title	Program	Grant value
2020	Untersuchungen von molekularen SARS-CoV-2-Wirt-Interaktionen mit gezielten Knockouts und Pulldowns (01KI20393, COVKOP). PI: Nikolaus Rajewsky	BMBF Erforschung von Covid-19 im Zuge des Ausbruchs von Sars-CoV-2.	
2014	Role of long non coding RNA in muscle differentiation and disease (MUNCODD). PI: Irene Bozzoni	ERC FP7	
2014	Deciphering non-coding RNA regulatory networks and their role in cancer cell biology. (RGP0009/2014) PI: Irene Bozzoni	HFSP Human Frontiers Science Project	
2011	RNA-based gene therapy of Duchenne Muscular Dystrophy: role of miRNA deregulation in the pathogenesis of DMD and their possible use for improving the exon skipping strategy (GGP11149). PI: Irene Bozzoni	Telethon	

Part VII – Research Activities

Keywords	Brief Description
RNA metabolism, poly(A) tails, gene regulation	Within this line of research, I developed a technique for full-length mRNA and poly(A) tail sequencing (FLAM-seq, Legnini et al., Nature Methods 2019), to study the functional role of poly(A) tails in the context of mammalian mRNA and non-coding RNA metabolism. I applied this technique to several biological problems, including that of deadenylation dynamics (Alles, Legnini et al., bioRxiv 2021), alterations of transcription termination upon infection (Rybak-Wolf et al., bioRxiv 2021) and <i>de novo</i> transcriptome annotation in non-model species such <i>Octopus vulgaris</i> (Zolotarov et al., bioRxiv 2022).
Optogenetics, Organoids, spatial and single cell transcriptomics, neurodevelopment	Within this line of research, I developed an approach to control gene expression in cells and organoids with spatio-temporal resolution, using optogenetics. I applied this approach to generate a Sonic Hedgehog organizer in neural organoids, and studied the impact of this morphogen on organoid tissue patterning and gene regulation by using single-cell and spatial transcriptomics (Legnini et al., bioRxiv 2021/2022).
Circular RNA, myogenesis	Within this line of research, I studied the expression dynamics and the functional role of circular RNAs in a cell differentiation system, such as myogenesis (Legnini et al., Molecular Cell 2017). By devising a high-content screen based on siRNA knock-downs, I could identify some of the first

circular RNAs with a biological function. Among these, I found that the circ-ZNF609 is required for myoblast proliferation, that it can be found associated with polysomes and that its overexpression produces a protein, pointing to the possibility that circular RNAs might be templates for protein synthesis. The abundance and relevance of circular RNA translation is highly debated, however the potential applications are numerous, such as that of stable and efficient RNA vaccines.

Part VIII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	18 papers , plus 1 accepted and 4 preprints (in submission/in revision)	Scopus	2010	2022
Books [scientific]	1 book chapter		2010	2022

Total Impact factor	189.418
Total Citations	3978 (as of 13.04.2022 in Scopus)
Average Citations per Product	209.368
Hirsch (H) index	16
Normalized H index*	1.33 (12 years of activity)

*H index divided by the academic seniority.

Part IX – Selected Publications

Publications in the last 10 years (valid for the evaluation), in chronological order

Source of publications and citations: Scopus as of 13.04.2022

Source of impact factor: Journal IF from the JCR (WoS Clarivate) is reported for the year of publication, or if the publication date is after 2020, the 2020 value is used.

1. Gomes-Duarte, A., Venø, M.T., de Wit, M., Senthilkumar, K., Broekhoven, M.H., van den Herik, J., Heeres, F.R., van Rossum, D., Rybiczká-Tesulov, M., **Legnini, I.**, van Rijen, P.C., van Eijsden, P., Gosselaar, P.H., Rajewsky, N., Kijms, J., Vangoor, V.R., Pasterkamp, R.J.

Expression of Circ_Satb1 Is Decreased in Mesial Temporal Lobe Epilepsy and Regulates Dendritic Spine Morphology (2022) *Frontiers in Molecular Neuroscience*, 15, art. no. 832133, DOI: 10.3389/fnmol.2022.832133. **Cited 0 times.**

Journal IF: 5.639

2. Wyler, E., Mösbauer, K., Franke, V., Diag, A., Gottula, L.T., Arsiè, R., Klironomos, F., Koppstein, D., Hönzke, K., Ayoub, S., Buccitelli, C., Hoffmann, K., Richter, A., **Legnini, I.**, Ivanov, A., Mari, T., Del Giudice, S., Papies, J., Praktijnjo, S., Meyer, T.F., Müller, M.A., Niemeyer, D., Hocke, A., Selbach, M., Akalin, A., Rajewsky, N., Drost, C., Landthaler, M.

Transcriptomic profiling of SARS-CoV-2 infected human cell lines identifies HSP90 as target for COVID-19 therapy (2021) *iScience*, 24 (3), art. no. 102151, DOI: 10.1016/j.isci.2021.102151. **Cited 42 times, Journal IF: 5.458**

3. Gasparini, S., Del Vecchio, G., Gioiosa, S., Flati, T., Castrignano, T., **Legnini, I.**, Licursi, V., Ricceri, L., Scattoni, M.L., Rinaldi, A., Presutti, C., Mannironi, C.

Differential Expression of Hippocampal Circular RNAs in the BTBR Mouse Model for Autism Spectrum Disorder (2020) *Molecular Neurobiology*, 57 (5), pp. 2301-2313. DOI: 10.1007/s12035-020-01878-6. **Cited 3 times. Journal IF: 5.590**

4. **Legnini, I.**, Alles, J., Karaiskos, N., Ayoub, S., Rajewsky, N.

FLAM-seq: full-length mRNA sequencing reveals principles of poly(A) tail length control

(2019) *Nature Methods*, 16 (9), pp. 879-886. DOI: 10.1038/s41592-019-0503-y. **Cited 37 times. Journal IF: 30.822**

5. Rossi, F., **Legnini, I.**, Megiorni, F., Colantoni, A., Santini, T., Morlando, M., Di Timoteo, G., Dattilo, D., Dominici, C., Bozzoni, I.
Circ-ZNF609 regulates G1-S progression in rhabdomyosarcoma
(2019) *Oncogene*, 38 (20), pp. 3843-3854. DOI: 10.1038/s41388-019-0699-4. **Cited 54 times. Journal IF: 7.971**
6. Voellenkle, C., Perfetti, A., Carrara, M., Fuschi, P., Renna, L.V., Longo, M., Sain, S.B., Cardani, R., Valaperta, R., Silvestri, G., **Legnini, I.**, Bozzoni, I., Furling, D., Gaetano, C., Falcone, G., Meola, G., Martelli, F.
Dysregulation of circular RNAs in myotonic dystrophy type 1.
(2019) *International Journal of Molecular Sciences*, 20 (8), art. no. 1938, DOI: 10.3390/ijms20081938. **Cited 18 times. Journal IF: 4.556**
7. Petrucci, G., Caputo, D., Lovecchio, N., Costantini, F., **Legnini, I.**, Bozzoni, I., Nascetti, A., de Cesare, G.
Multifunctional System-on-Glass for Lab-on-Chip applications
(2017) *Biosensors and Bioelectronics*, 93, pp. 315-321. DOI: 10.1016/j.bios.2016.08.060. **Cited 25 times. Journal IF: 8.173**
8. **Legnini, I.**, Di Timoteo, G., Rossi, F., Morlando, M., Briganti, F., Sthandier, O., Fatica, A., Santini, T., Andronache, A., Wade, M., Laneve, P., Rajewsky, N., Bozzoni, I.
Circ-ZNF609 Is a Circular RNA that Can Be Translated and Functions in Myogenesis
(2017) *Molecular Cell*, 66 (1), pp. 22-37.e9. DOI: 10.1016/j.molcel.2017.02.017. **Cited 1080 times. Journal IF: 14.248**
9. Errichelli, L., Dini Modigliani, S., Laneve, P., Colantoni, A., **Legnini, I.**, Caputo, D., Rosa, A., De Santis, R., Scarfò, R., Peruzzi, G., Lu, L., Caffarelli, E., Shneider, N.A., Morlando, M., Bozzoni, I.
FUS affects circular RNA expression in murine embryonic stem cell-derived motor neurons
(2017) *Nature Communications*, 8, art. no. 14741, DOI: 10.1038/ncomms14741. **Cited 232 times. Journal IF: 12.353**
10. Laneve, P., Po, A., Favia, A., **Legnini, I.**, Alfano, V., Rea, J., Di Carlo, V., Bevilacqua, V., Miele, E., Mastronuzzi, A., Carai, A., Locatelli, F., Bozzoni, I., Ferretti, E., Caffarelli, E.
The long noncoding RNA linc-NeD125 controls the expression of medulloblastoma driver genes by microRNA sponge activity
(2017) *Oncotarget*, 8 (19), pp. 31003-31015. DOI: 10.18632/oncotarget.16049. **Cited 31 times. Journal IF: 5.168**
11. Martone, J., Briganti, F., **Legnini, I.**, Morlando, M., Picillo, E., Sthandier, O., Politano, L., Bozzoni, I.
The lack of the Celf2a splicing factor converts a Duchenne genotype into a Becker phenotype
(2016) *Nature Communications*, 7, art. no. 10488, DOI: 10.1038/ncomms10488. **Cited 17 times. Journal IF: 12.124**
12. Mangiavacchi, A., Sorci, M., Masciarelli, S., Larivera, S., **Legnini, I.**, Iosue, I., Bozzoni, I., Fazi, F., Fatica, A.
The miR-223 host non-coding transcript linc-223 induces IRF4 expression in acute myeloid leukemia by acting as a competing endogenous RNA
(2016) *Oncotarget*, 7 (37), pp. 60155-60168. DOI: 10.18632/oncotarget.11165. **Cited 28 times. Journal IF: 5.168**
13. Hughes, J.M., **Legnini, I.**, Salvatori, B., Masciarelli, S., Marchioni, M., Fazi, F., Morlando, M., Bozzoni, I., Fatica, A.
C/EBP α -p30 protein induces expression of the oncogenic long non-coding RNA UCA1 in acute myeloid leukemia
(2015) *Oncotarget*, 6 (21), pp. 18534-18544. DOI: 10.18632/oncotarget.4069. **Cited 61 times. Journal IF: 5.008**
14. **Legnini, I.**, Morlando, M., Mangiavacchi, A., Fatica, A., Bozzoni, I.
A Feedforward Regulatory Loop between HuR and the Long Noncoding RNA linc-MD1 Controls Early Phases of Myogenesis
(2014) *Molecular Cell*, 53 (3), pp. 506-514. DOI: 10.1016/j.molcel.2013.12.012. **Cited 164 times. Journal IF: 14.018**
15. Twayana, S., **Legnini, I.**, Cesana, M., Cacchiarelli, D., Morlando, M., Bozzoni, I.
Biogenesis and function of non-coding RNAs in muscle differentiation and in Duchenne muscular dystrophy
(2013) *Biochemical Society Transactions*, 41 (4), pp. 844-849. DOI: 10.1042/BST20120353. **Cited 30 times. Journal IF: 3.238**

Publications before 2012

17. Cesana, M., Cacchiarelli, D., **Legnini, I.**, Santini, T., Sthandier, O., Chinappi, M., Tramontano, A., Bozzoni, I. A long noncoding RNA controls muscle differentiation by functioning as a competing endogenous RNA (2011) *Cell*, 147 (2), pp. 358-369. DOI: 10.1016/j.cell.2011.09.028. **Cited 1932 times. Journal IF: 32.403**
18. Cacchiarelli, D., **Legnini, I.**, Martone, J., Cazzella, V., D'Amico, A., Bertini, E., Bozzoni, I. miRNAs as serum biomarkers for Duchenne muscular dystrophy (2011) *EMBO Molecular Medicine*, 3 (5), pp. 258-265. DOI: 10.1002/emmm.201100133. **Cited 189 times. Journal IF: 10.333**
19. Incitti, T., De Angelis, F.G., Cazzella, V., Sthandier, O., Pinnarò, C., **Legnini, I.**, Bozzoni, I. Exon skipping and duchess muscular dystrophy therapy: Selection of the most active U1 snRNA antisense able to induce dystrophin exon 51 skipping (2010) *Molecular Therapy*, 18 (9), pp. 1675-1682. DOI: 10.1038/mt.2010.123. **Cited 34 times. Journal IF: 7.149**

Book chapters

1. **Legnini, I.**, Bozzoni, I. Circular RNAs Expression, Function, and Regulation in Neural Systems (2017) *Essentials of Noncoding RNA in Neuroscience: Ontogenetics, Plasticity of the Vertebrate Brain*, pp. 247-263. DOI: 10.1016/B978-0-12-804402-5.00014-5. **Cited 1 time.**

Preprints

1. Zolotarov, G., Fromm, B., **Legnini, I.**, Ayoub, S., Polese, G., Maselli, V., Chabot, P.J., Vinther, J., Styfhals, R., Seuntjens, E., Cosmo, A.D., Peterson, K.J., Rajewsky, N. MicroRNAs are deeply linked to the emergence of the complex octopus brain (2022) *bioRxiv*, DOI: 10.1101/2022.02.15.480520.
2. Alles, J.*, **Legnini, I.***, Pacelli, M., Rajewsky, N. 57194226438;36106952500;57381334000;57203690892; Rapid nuclear deadenylation of mammalian messenger RNA (2021) *bioRxiv*, DOI: 10.1101/2021.11.16.468655. *co-first authors
3. **Legnini, I.**, Emmenegger, L., Wurmus, R., Zappulo, A., Martinez, A.O., Jara, C.C., Boltengagen, A., Hessler, T., Mastrobuoni, G., Rybak-Wolf, A., Kempa, S., Zinzen, R., Woehler, A., Rajewsky, N. Optogenetic perturbations of RNA expression in tissue space (2021) *bioRxiv*, DOI: 10.1101/2021.09.26.461850. Revised version (2022): DOI 10.1101/2021.09.26.461850. **Cited 2 times.**
4. Rybak-Wolf, A., Wyler, E., **Legnini, I.**, Loewa, A., Glažar, P., Kim, S.J., Pentimalli, T.M., Martinez, A.O., Beyersdorf, B., Woehler, A., Landthaler, M., Rajewsky, N. Neurodegeneration in human brain organoids infected with herpes simplex virus type 1 (2021) *bioRxiv*, DOI: 10.1101/2021.03.05.434122.

Accepted for publication

1. Nielsen, A.F., Bindereif, A., Bozzoni, I., Hanan, M., Hansen, T.B., Irimia, M., Kadener, S., Kristensen, L.S., **Legnini, I.**, Morlando, M., Jarlstad Olesen, M., Pasterkamp, R.J., Preibisch, S., Rajewsky, N., Suenkel, C., Kjems, J. Best practice standards for circRNA research (2022) *Nature Methods*, accepted for publication on March 16th 2022. **Journal IF: 28.547.**