

<https://doi.org/10.7124/bc.000B91>

I.Ya. Skrypkina¹, P.O. Areshkov¹, O.V. Zhuk^{1,2},
T.V. Bukreieva^{1,2}, Iu.I. Palamarchuk³, V.Iu. Molotkovets^{3,4},
O.V. Anopriienko¹, V.V. Medvediev³, K.V. Onyshchenko^{1,5}

¹ Institute of Molecular Biology and Genetics, NAS of Ukraine
150, Akademika Zabolotnoho Str., Kyiv, Ukraine, 03143

² Institute of Cell Therapy
3, Liubomyra Huzara Ave., Kyiv, Ukraine, 03126

³ Bogomolets National Medical University
13, Tarasa Shevchenko Blvd., Kyiv, Ukraine, 01601

⁴ SI "Romodanov Neurosurgery Institute National Academy of Medical Sciences of Ukraine"
32, Platon Maiboroda Str., Kyiv, Ukraine, 04050

⁵ Emory University School of Medicine
100, Woodruff Circle, Atlanta, GA, USA, 30322
inessa.skrypkina@gmail.com

ALTERNATIVE SPLICING OF *ITSN1* AND *CHI3L1* ISOFORMS IN GLIOBLASTOMA

Background. Alternative splicing (AS) expands transcriptomic and proteomic diversity, generating protein isoforms with specific or opposing functions. Aberrant AS contributes to glioblastoma (GBM) development and aggressiveness. Consequently, isoform-specific therapeutic approaches are emerging as promising strategies for targeted cancer treatment. Building upon TCGA datasets and previous functional studies of *ITSN1* (*ITSN1-L*, *ITSN1-S*) and *CHI3L1* (*CHI3L1-FL*, *CHI3L1-del8*) isoforms in glioma cell lines, the present study **aimed** to investigate their distribution in human GBM specimens. **Methods.** Patient samples of IDH-wt GBM were collected following informed consent and in accordance with ethical regulations. Tumor tissues ($n = 35$) and matched adjacent non-tumorous brain tissues ($n = 10$) were obtained from patients undergoing surgical resection. Transcript levels were quantified by RT-qPCR using isoform-specific primers designed in our laboratory. The RPLP0 and GAPDH were used for normalization. Diagnostic performance was evaluated by ROC curve analysis. The *ITSN1-L*/*ITSN1-S* ratio was calculated from their normalized expression levels. **Results.** Statistically significant alterations in isoform expression were observed in GBM samples. mRNA levels of both *CHI3L1* isoforms were increased in tumors vs control tissues (AUC-del8 = 0.9298, 95% CI 0.8495 to 1,000; AUC-FL = 0.9444, 95% CI 0.8371 to 1,000). In contrast, both *ITSN1* transcripts were significantly decreased in GBM (AUC-S = 0.9402, 95% CI 0.9351 to 1,000; AUC-L = 0.9658, 95% CI 0.9612 to 1,000). Moreover, reduced relative abundance of the *ITSN1-L* vs *ITSN1-S* was detected in tumor tissues (AUC = 0.9231, 95% CI 0.8779 to 1,000). **Conclusions.** This pilot study demonstrates altered regulation of the major *ITSN1* and *CHI3L1* transcript isoforms in GBM. The pronounced reduction of *ITSN1-L* vs *ITSN1-S* supports previous reports suggesting a stronger tumor-suppressive role for the *ITSN1-L*. These results highlight the importance of AS in GBM biology and suggest the potential of specific isoforms as diagnostic biomarkers and therapeutic targets. **Funding.** This work was supported by a grant from the NAS of Ukraine for research laboratories of young scientists conducting studies in priority areas of science and technology development (2025–2026, #0125U001298) and IMBG Simons Foundation Grant for Ukrainian institutions (№ SFI-PD-Ukraine-00017453).

Keywords: GBM; *ITSN1*; *CHI3L1*; alternative splicing; transcript isoforms.

Received: 08.06.2026; Accepted: 08.09.2026; Published: 29.09.2026

Citation: Skrypkina I.Ya., Areshkov P.O., Zhuk O.V., Bukreieva T.V., Palamarchuk Iu.I., Molotkovets V.Iu., Anopriienko O.V., Medvediev V.V., Onyshchenko K.V. (2026) Alternative splicing of *ITSN1* and *CHI3L1* isoforms in glioblastoma. *Biopolymers & Cell*, Special issue(42), 86. <https://doi.org/10.7124/bc.000B91>

© Publisher PH "Akademperiodyka" of the NAS of Ukraine, 2026. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited