Raffaele Badolato, M.D., Ph.D.
Curriculum Vitae

PERSONAL DETAILS

Name: Raffaele Badolato
Place and date of birth: Catanzaro, Italy - September 24, 1965
Present address: (work) Clinica Pediatrica, Universita' di Brescia
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EDUCATION and ACADEMIC ACHIEVEMENTS

Nov 2018-today	Director of the Pediatric Residency Programme, University of Brescia
Nov2016-today	Full Professor of Pediatrics, University of Brescia, Italy
2015-today	Head of Paediatric Outpatient Services, Asst Spedali civili, Brescia, Italy
2015-today	Head of Paediatric Rare Diseases P., Asst Spedali civili, Brescia, Italy
2015-16	Director of the Paediatric Neuropsychiatry Resident Programme
2008	Master for Clinical Management (IREF), SDA Bocconi University, Milan, Italy
2006-2016	Associate Professor of Paediatrics, Faculty of Medicine, University of Brescia (Italy)
2000-2006	Assistant Professor of Paediatrics, Faculty of Medicine, University of Brescia Assistant Professor of "Paediatric Immunology", Faculty of Medicine, University of Brescia Assistant Professor of "Physiopathology of immune response", Specialization in Paediatrics, University of Brescia
1998-2000	Assistant Professor of Clinical Pathology, School for Biomedical Technicians
1997-2000	Attending physician, Division of Pediatrics, Spedali Civili, Brescia, Italy.
1995-99	Ph.D. fellowship in "Cellular and Molecular Diagnosis and Treatment", University of Udine, Italy.
1993-94	Research Associate, National Cancer Institute (NCI-FCRDC), Frederick, MD, USA Laboratory of Molecular Immunoregulation, Dr. J. J. Oppenheim
1992.93	Special Volunteer, National Cancer Institute (NCI-FCRDC), Frederick, MD, USA, Laboratory of Molecular Immunoregulation, Biological Response Modifiers Program (Supervisor Dr. D. J. Kelvin)
1992	Specialization in Pediatrics Magna cum laude, University "Federico II", Naples, Italy
1989	M.D., Magna cum laude, University "Federico II", Naples, Italy. Certificate of the Italian Board of Physicians and Surgeons.
1983-89	Student at the Faculty of Medicine of the University "Federico II", Naples, Italy

Membership to Societies

Society of Leukocyte Biology, *since 2008*
European Society for Immunodeficiencies (ESID), *since 2008*
Italian Society of Pediatrics, *since 2000*
Italian Society of Immmunology (SIICA), *since 2003*
Italian Society of Pediatric Research*, President*

Grants and Awards

2020 "Joint artificial intelligence and protein structure modelling to guide large-scale screenings for anti-SARS-Cov2 neutralizing antibodies" (CORONAiD) funded by Regione Lombardia, Fondazione Cariplo € 60000

2018 Grant entitled "From allergic and autoimmune diseases to immune-dysregulated disorders: clinical, immunological, genetic characterization and proposal of diagnostic and therapeutic protocols", Italian Ministry of Health € 148500

2015 Ministry of Health grant "Genetic and immunological study of children with Crohn's disease receiving thalidomide treatment"

2012 eRare: European grant agency
PRIN: grant from the Italian Ministry of Research

2010 Journal of Translational Medicine Bedside to Bench Award.
Telethon grant: Understanding the WHIM syndrome : new roles for CXCR4 activation.

2009 Fondazione Cariplo "Ricerca Scientifica in ambito biomedico"The Role and mechanism of function of CXCR4 in the adaptive response related pathology of WHIM syndrome patients"

2008 FP7 European Community Grant: HLH-Cure

2007 PRIN 2007: grant from the Italian Ministry of Research

2007 Telethon grants: "From Foxp3 mutation to IPEX: genotype, phenotype, pathogenetic mechanisms and therapeutic options" (GGP04285) and Understanding the WHIM syndrome : new roles for CXCR4 activation.

2005 PRIN 2005: grant from the Italian Ministry of Research

2004 Telethon grant GGP04285 "From Foxp3 mutation to IPEX: genotype, phenotype, pathogenetic mechanisms and therapeutic options"

2003 Ministry of Health grant "Characterization of immune response in Crohn disease: NOD2 genotype correlation with clinical phenotype

1996 Fellowship from Telethon Committee for the study of genetic diseases

1992 Fellowship from Italian Association for Cancer Research (AIRC)

Raffaele Badolato is Specialty Editor in chief for *Frontiers in Pediatric Immunology* since 2014, serves since 2007 Editorial Board member for *The Journal of Leukocyte Biology*.

Raffaele Badolato serves as Reviewer for several biomedical and immunology Journals, including *New England Journal of Medicine, Journal of Expeimental Medicine, Journal of Clinical Investigation, Blood, Journal of Immunology, Journal of Leukocyte Biology, Journal of Clinical Immunology, Rheumatology, Clinical Immunoloy, Pediatric Infectious Disease Journal*.

Publications (Selection from Pubmed)

1. **Badolato, R.**, Wang, J. M., Murphy, W. J., Lloyd, A. R., Michiel, D. F., Baussermann, L. L., Kelvin, D. D., and Oppenheim, J. J. (1994). Serum amyloid A is a chemoattractant: induction of migration, adhesion and tissue infiltration of monocytes and polymorphonuclear leukocytes *J. Exp. Med.* 180:203-209
2. Musso, T., **Badolato, R.**, Longo, D. L., Gusella, L., and Varesio, L. (1995). Leukemia inhibitory factor induces IL-8 and MCAF in human monocytes: differential regulation by IFN-gamma *Blood* 86:1961-1967.
3. Xu, L. L., **Badolato, R.**, Murphy, W. J., Longo, D. L., Anver, M., Hale, S., Oppenheim, J. J., and Wang, J. M. (1995). A novel biological function of serum amyloid A: induction of T lymphocyte migration and adhesion. *J. Immunol.* 155:1184-1190.
4. **Badolato, R.**, Johnston, J. A., Wang, J. M., McVicar, D., Xu, L. L., Oppenheim, J. J., and Kelvin, D. J. (1995). Serum amyloid A induces calcium mobilization and chemotaxis of human monocytes by activating a pertussis toxin-sensitive pathway. *J. Immunol*. 155:4004-4010.
5. Carrera, L., Gazzinelli, R. T., **Badolato, R.**, Hieny, S., Müller, W., Kühn, R., and Sacks, D. L. (1996) *Leishmania* promastigotes selectively inhibits interleukin 12 induction in bone marrow-derived macrophages from susceptible and resistent mice. *J. Exp. Med.* 183:515-526.
6. **Badolato, R.**, and Oppenheim, J. J (1996). Role of cytokines, acute phase proteins, and chemokines in the progression of rheumatoid arthritis. *Sem. Arth.& Reum.* 26: 526-538.
7. **Badolato, R**., Negro Ponzi, A., Millesimo, M., Notarangelo, L.D., and Musso,T. (1997). IL-15 induces IL-8 and MCP-1 production in human monocytes. *Blood* 90: 2804-2809.
8. Kitazawa, H., Muegge, K., **Badolato, R.**, Wang, J.M., Fogler, W.E., Ferris, D.K., Lee, C.K., Candeias, S., Smith, M.R., Oppenheim, J.J., and Durum, S.K. (1997). IL-7 activates a_4b_1 integrin in murine thymocytes. *J. Immunol.* 159: 2259-2264.
9. Candotti, F., Oakes, S.C., Giliani, S., Johnston, J.A., Schumacher, R.F., **Badolato, R**., Notarangelo, L.D., Bozzi, F., Strina, D., Vezzoni, P., Blaese, R. M., O'Shea, J.J., and Villa, A (1997). Structural and functional basis for Jak-3 deficient severe combined immunodeficiency. *Blood* 90: 3996-4003.
10. Musso, T., Calosso, L., Zucca, M., Millesimo, M., Puliti, M., Bulfone-Paus, S., Merlino, C., Savoia, D., Cavallo, R., Negro Ponzi, A., and **Badolato R**. (1998). IL-15 activates pro-inflammatory and anti-microbial functions in polymorphonuclear cells (PMN). *Infect. & Immun.* 66 (6):2640:2647.
11. **Badolato, R.,** Sozzani, S., Malacarne, F., Bresciani, S., Fiorini, M., Borsatti, A., Albertini, A., Mantovani, A., Ugazio, A.G., and Notarangelo, L.D. (1998). Monocytes from Wiskott-Aldrich patients display reduced chemotaxis and lack of cell-polarization in response to MCP-1 and fMLP. *J. Immunol.* 161: 1026-1033.
12. Facchetti, F., Vermi, W., Fiorentini, S., Chilosi, M., Caruso, A., Duse, M., Notarangelo, L.D., and **Badolato, R.** (1999). Expression of inducible nitric oxide synthase in human granulomas and histiocytic reactions. *Am. J. Pathol.* 154(1):145-152.
13. **Badolato R.**, Wang J.M., Stornello S.L., Negro Ponzi A., Duse M., Musso T. (2000). Serum Amyloid A is an activator of PMN antimicrobial functions: induction of degranulation, phagocytosis and enhancement of anti-Candida activity.*J. Leuk. Biol*. 67: 381-386.
14. Ferrari, S, Giliani, S., Insalaco A., Al-Ghonaium A, Soresina AR, Loubser M, Avanzini MA, Marconi M, **Badolato R**, Levy Y, Catalan N, Durandy A, Tbakhi A, Notarangelo, L. D., and Plebani, A. Mutations of CD40 gene cause a novel autosomal recessive form of hyper IgM (HIGM3). (2001) *Proc Natl Acad Sci U S A* . 98:12614-12619.

15. Allavena P, **Badolato R**, Facchetti F, Vermi W, Paganin C, Luini W, Giliani S, Mazza C, Bolzern U, Chiesa I, Notarangelo LD, Mantovani A, and Sozzani S. Monocytes from Wiskott-Aldrich Patients Differentiate in Functional Mature Dendritic Cells (2001). *Eur J Immunol* 31:3413-3421.
16. Fiorini M, Vermi W, Facchetti F, Moratto D, Alessandri G, Notarangelo L, Caruso A, Grigolato P, Ugazio AG, Notarangelo LD, and **Badolato R.** Defective migration of monocyte-derived dendritic cells in LAD-1 immunodeficiency. (2002) *J Leuk Biol* 72:650-656.
17. **Badolato R.**, Notarangelo LD, Plebani A, Roos D. Development of systemic lupus erythematosus in a young child affected with chronic granulomatous disease following withdrawal of treatment with interferon-gamma (2003). *Rheumatology* 42 (6): 804.
18. Buzi F, **Badolato R.**, Mazza C, Giliani S., Notarangelo L.D., Radetti G., Notarangelo LD Autoimmune polyendocrinopathy-candidiasis-ectodermal dystrophy syndrome: Time to review diagnostic criteria? (2003). *J Clin Endocr & Metab* 88 (7): 3146-3148.
19. Fontana S, Moratto D, Mangal S, De Francesco M, Vermi W, Ferrari S, Facchetti F, Kutukculer N, Fiorini C, Duse M, Das PK, Notarangelo LD, Plebani A, **Badolato R.** Functional defects of dendritic cells in CD40-deficient patients. (2003). *Blood*. 102 (12): 4099-4106.
20. Gulino AV, Moratto D, Sozzani S, Cavadini P, Otero K, Tassone L, Imberti L, Pirovano S, Notarangelo LD, Soresina R, Mazzolari E, Nelson DL, Notarangelo LD, and **Badolato R.** Altered leukocyte response to CXCL12 in patients with Warts Hypogammaglobulinemia, Infections, Myelokathexis (WHIM) syndrome. (2004). *Blood*. 104:444-452.
21. Vulcano M, Dusi S, Lissandrini D, **Badolato R**, Mazzi P, Ribaldi E, Borroni E, Calleri A, Donini M, Plebani A, Notarangelo LD, Musso T, Sozzani S. Toll receptor-mediated regulation of NADPH oxidase in human dendritic cells. (2004). *J Immunol*, 173: 5749-5756.
22. Cavadini P, Vermi W, Facchetti F, Fontana S, Nagafuchi S, Mazzolari E, Sediva A, Marrella V, Villa A, Fischer A, Notarangelo LD, **Badolato R.** AIRE deficiency in thymus of 2 patients with Omenn syndrome. (2005). *J Clin Invest.* 115: 728-732.
23. Vermi W, Facchetti F, Riboldi E, Heine H, Scutera S, Stornello S, Ravarino D, Cappello P, Giovarelli M, **Badolato R**, Zucca M, Gentili F, Chilosi M, Doglioni C, Ponzi AN, Sozzani S, Musso T. Role of dendritic cell-derived CXCL13 in the pathogenesis of Bartonella henselae B-rich granuloma. (2006). *Blood*. 107(2):454-62.
24. Notarangelo LD, Gambineri E, **Badolato R.** Immunodeficiencies with autoimmune consequences. (2006). *Adv in Immunol* 89-321-359.
25. Fontana S, Parolini S, Vermi W, Booth S, Gallo F, Donini M, Benassi M, Gentili F, Ferrari D, Notarangelo LD, Cavadini P, Marcenaro E, Dusi S, Cassatella M, Facchetti F, Griffiths GM, Moretta A, Notarangelo LD, **Badolato R**.Innate immunity defects in Hermansky-Pudlak type 2 syndrome. (2006). *Blood* 107:4857-4864.
26. Donini M, Fontana S, Savoldi G, Vermi W, Tassone L, Gentili F, Denaro E, Ferrari D, Notarangelo LD, Porta F, Facchetti F, Notarangelo LD, Dusi S, and **Badolato R**. G-CSF treatment of Severe Congenital Neutropenia reverses neutropenia but does not correct the underlying functional deficiency of the neutrophil in defending against microorganisms. (2007). *Blood 109: 4716-4723*
27. Duan z, Person RE, Lee HH, Huang S, Donadieu J, **Badolato R**, Grimes HL, Papayannopoulou T, and Horwitz MS. Epigenetic Regulation of Protein-Coding and MicroRNA Genes by the Gfi1-Interacting Tumor Suppressor PRDM5. (2007). *Mol Cell Biol.* 2007 Oct;27(19):6889-902.
28. **Badolato R**, Parolini S. Novel insights from adaptor protein 3 complex deficiency.*J Allergy Clin Immunol*. 2007 Oct;120(4):735-41; quiz 742-3. Review.

29. Notarangelo LD, **Badolato R.** Leukocyte trafficking in primary immunodeficiencies *J. Leuk Biol*, 2009, 85(3):335-43.
30. Tassone L, NotarangeloLD, Bonomi V, Savoldi G, Sensi A, Soresina A, Smith CIE, Porta F , Plebani A, Notarangelo LD, **Badolato, R**. Clinical and genetic diagnosis of Warts, Hypogammaglobulinemia, Infections, Myelokathexis (WHIM) syndrome in 10 patients. *J Allergy Clin Immunol*. 2009 123(5):1170-3, 1173.e1-3
31. Nicola Tamassia, Monica Castellucci, Marzia Rossato, Sara Gasperini, Daniela Bosisio, Mauro Giacomelli, **Raffaele Badolato,** Marco A. Cassatella, and Flavia Bazzoni . Uncovering an IL-10-dependent NF-kB recruitment to the IL-1ra promoter that is impaired in STAT3 functionally defective patients. *FASEB Journal* 2010 24(5):1365-75
32. Barbara Cassani, Pietro Luigi Poliani, Daniele Moratto, Cristina Sobacchi, Veronica Marrella, Laura Imperatori, Donatella Vairo, Alessandro Plebani, Silvia Giliani, Paolo Vezzoni, Fabio Facchetti, Fulvio Porta, Luigi D. Notarangelo, Anna Villa, **Raffaele Badolato.** Defect of regulatory T cells in patients with Omenn Syndrome. *J Allergy Clin Immunol*. 2010, 125(1):209-16.
33. Chiarini M, Sabelli C, Melotti P, Garlanda C, Savoldi G, Mazza C, Padoan R, Plebani A, Mantovani A, Notarangelo LD, Assael BM, **Badolato R.** PTX3 genetic variations affect the risk of Pseudomonas aeruginosa airway colonization in cystic fibrosis patients. *Genes&Immunity* 2010 11(8):665-70.
34. Tassone L, Moratto D, Vermi W, De Francesco M, Notarangelo LD, Porta F, Lougaris V, Facchetti F, Plebani A, **Badolato R**. Defect of plasmacytoid dendritic cells in warts, hypogammaglobulinemia, infections, myelokathexis (WHIM) syndrome patients. *Blood.* 2010 116(23):4870-3.
35. Mazza C, Buzi F, Ortolani F, Vitali A, Notarangelo LD, Weber G, Bacchetta R, Soresina A, Lougaris V, Greggio NA, Taddio A, Pasic S, de Vroede M, Pac M, Kilic SS, Ozden S, Rusconi R, Martino S, Capalbo D, Salerno M, Pignata C, Radetti G, Maggiore G, Plebani A, Notarangelo LD, **Badolato R**. Clinical heterogeneity and diagnostic delay of autoimmune polyendocrinopathy-candidiasis-ectodermal dystrophy syndrome.*Clin Immunol.* 2011 2011 Apr;139(1):6-11.
36. Dotta L, Tassone L, **Badolato R**. Clinical and genetic features of Warts, Hypogammaglobulinemia, Infections and Myelokathexis (WHIM) syndrome. *Curr Mol Med*. 2011 Jun;11(4):317-25.
37. Vairo D, Tassone L, Tabellini G, Tamassia N, Gasperini S, Bazzoni F, Plebani A, Porta F, Notarangelo LD, Parolini S, Giliani S, **Badolato R.** Severe impairment of IFN-{gamma} and IFN-{alpha} responses in cells of a patient with a novel STAT1 splicing mutation. Blood. 2011 Aug 18;118(7):1806-17.
38. Giacomelli BM, Tamassia N, Moratto D, Bertolini P, Ricci G, Bertulli C, Plebani A, Cassatella M, Bazzoni F, **Badolato R.** SH2 domain mutations of STAT3 gene result in impairment of IL-10 function in hyper-IgE syndrome patients. *Eur J Immunol.* 2011 Jul 26 (10):3075-84.
39. **Raffaele Badolato,** Alberto Prandini, Sonia Caracciolo, Francesca Colombo, Giovanna Tabellini, Mauro Giacomelli, Maria E. Cantarini, Andrea Pession, Callum J. Bell, Darrell L. Dinwiddie, Neil A. Miller, Shannon L. Hateley, Carol J. Saunders, Lu Zhang, Gary P. Schroth, Alessandro Plebani, Silvia Parolini, Stephen F. Kingsmore. Exome sequencing reveals a pallidin mutation in a Hermansky-Pudlak-like primary immunodeficiency syndrome. *Blood*, 2012 119(13):3185-7.
40. Combined DOCK8 and CLEC7A mutations causing immunodeficiency in 3 brothers with diarrhea, eczema, and infections. Dinwiddie DL, Kingsmore SF, Caracciolo S, Rossi G, Moratto D, Mazza C, Sabelli C, Bacchetta R, Passerini L, Magri C, Bell CJ, Miller NA, Hateley SL, Saunders CJ, Zhang L, Schroth GP, Barlati S, Badolato R. *J Allergy Clin Immunol.* 2013 Feb;131(2):594-597.

41. **Badolato R**. Defects of leukocyte migration in primary immunodeficiencies.*Eur J Immunol.* 2013 Apr 30. doi: 10.1002/eji.201243155.
42.Kallikourdis M, Trovato AE, Anselmi F, Sarukhan A, Roselli G, Tassone L, **Badolato R**, Viola A. The CXCR4 mutations in WHIM syndrome impair the stability of the T cell immunological synapse. *Blood*. 2013 Jun 21. 122 :666-673
43. Dotta L, **Badolato R.** Primary immunodeficiencies appearing as combined lymphopenia, neutropenia, and monocytopenia. *Immunol Lett.* 2013 Dec 4. pii: S0165-2478(13)00202-2. doi: 10.1016/j.imlet.2013.11.018
44. Dotta L, Parolini S, Prandini A, Tabellini G, Antolini M, Kingsmore SF, **Badolato R.** Clinical, laboratory and molecular signs of immunodeficiency in patients with partial oculocutaneous albinism. *Orphanet J Rare Dis.* 2013 Oct 17;8:168. doi: 10.1186/1750-1172-8-168.
45.Lorenzi L, Tabellini G, Vermi W, Moratto D, Porta F, Notarangelo LD, Patrizi O, Sozzani S, de Saint Basile G, Latour S, Pace D, Lonardi S, Facchetti F, **Badolato R,** Parolini S.Occurrence of nodular lymphocyte-predominant hodgkin lymphoma in hermansky-pudlak type 2 syndrome is associated to natural killer and natural killer T cell defects. *PLoS One.* 2013 Nov 26;8(11):e80131. doi: 10.1371/journal.pone.0080131.
46. Seeger P, Bosisio D, Parolini S, **Badolato R**, Gismondi A, Santoni A, Sozzani S. Activin A as a Mediator of NK-Dendritic Cell Functional Interactions. *J Immunol.* 2014 Feb 1;192(3):1241-8. doi: 10.4049/jimmunol.1301487. Epub 2014 Jan 6.
47. **Badolato R.** Primary immunodeficiences--options for the future. *Pediatr Allergy Immunol.* 2014 Feb;25(1):27-9. doi: 10.1111/pai.12192.
48. Caracciolo S, Moratto D, Giacomelli M, Negri S, Lougaris V, Porta F, Pajno G, Salpietro A, Montin D, Dinwiddie DL, Kingsmore SF, Plebani A, **Badolato R.** Expansion of CCR4+ activated T cells is associated with memory B cell reduction in DOCK8-deficient patients. *Clin Immunol.* 2014 May-Jun;152(1-2):164-70. doi: 10.1016/j.clim.2014.03.008. Epub 2014 Mar 24.
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50. Prandini A, Salvi V, Colombo F, Moratto D, Lorenzi L, Vermi W, De Francesco MA, Notarangelo LD, Porta F, Plebani A, Facchetti F, Sozzani S, **Badolato R**. Impairment of dendritic cell functions in patients with adaptor protein-3 complex deficiency. *Blood*. 2016 Jun 30;127(26):3382-6. doi: 10.1182/blood-2015-06-650689
51. Lougaris V, Moratto D, Baronio M, Tampella G, van der Meer JW, **Badolato R**, Fliegauf M, Plebani A. Early and late B-cell developmental impairment in nuclear factor kappa B, subunit 1-mutated common variable immunodeficiency disease. *J Allergy Clin Immunol.* 2017 Jul 16. pii: S0091-6749(16)30628-5. doi: 10.1016/j.jaci.2016.05.045.
52. Lorenzini T, Dotta L, Giacomelli M, Vairo D, **Badolato R.** STAT mutations as program switchers: turning primary immunodeficiencies into autoimmune diseases. *J Leukoc Biol*. 2017 Jan;101(1):29-38. doi: 10.1189/jlb.5RI0516-237RR. Epub 2016 Nov 1. Review.
53.Gallo V, Dotta L, Giardino G, Cirillo E, Lougaris V, D'Assante R, Prandini A, Consolini R, Farrow EG, Thiffault I, Saunders CJ, Leonardi A, Plebani A, **Badolato R,** Pignata C. Diagnostics of Primary Immunodeficiencies through Next-Generation Sequencing. *Front Immunol.* 2016 Nov 7;7:466. eCollection 2016.

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58. Badolato R, Donadieu J; WHIM Research Group. How I treat warts, hypogammaglobulinemia, infections, and myelokathexis syndrome. Blood. 2017 Dec 7;130(23):2491-2498. doi: 10.1182/blood-2017-02-708552. Epub 2017 Oct 24. Review.

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60.De Rose DU, Giliani S, Notarangelo LD, Lougaris V, Lanfranchi A, Moratto D, Martire B, Specchia F, Tommasini A, Plebani A, Badolato R. Long term outcome of eight patients with type 1 Leukocyte Adhesion Deficiency (LAD-1): Not only infections, but high risk of autoimmune complications. Clin Immunol. 2018 Jun;191:75-80. doi: 10.1016/j.clim.2018.03.005. Epub 2018 Mar 13.

61. Saettini F, Moratto D, Grioni A, Maitz S, Iascone M, Rizzari C, Pavan F, Spinelli M, Bettini LR, Biondi A, **Badolato R.** A novel EP300 mutation associated with Rubinstein-Taybi syndrome type 2 presenting as combined immunodeficiency. *Pediatr Allergy Immunol*. 2018 Nov;29(7):776-781. doi: 10.1111/pai.12968. Epub 2018 Sep 28.

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