

World Journal of *Gastroenterology*

World J Gastroenterol 2017 August 21; 23(31): 5645-5828





Editorial Board

2014-2017

The *World Journal of Gastroenterology* Editorial Board consists of 1375 members, representing a team of worldwide experts in gastroenterology and hepatology. They are from 68 countries, including Algeria (2), Argentina (7), Australia (31), Austria (9), Belgium (11), Brazil (20), Brunei Darussalam (1), Bulgaria (2), Cambodia (1), Canada (25), Chile (4), China (165), Croatia (2), Cuba (1), Czech (6), Denmark (2), Egypt (9), Estonia (2), Finland (6), France (20), Germany (58), Greece (31), Guatemala (1), Hungary (14), Iceland (1), India (33), Indonesia (2), Iran (10), Ireland (9), Israel (18), Italy (194), Japan (149), Jordan (1), Kuwait (1), Lebanon (7), Lithuania (1), Malaysia (1), Mexico (11), Morocco (1), Netherlands (5), New Zealand (4), Nigeria (3), Norway (6), Pakistan (6), Poland (12), Portugal (8), Puerto Rico (1), Qatar (1), Romania (10), Russia (3), Saudi Arabia (2), Singapore (7), Slovenia (2), South Africa (1), South Korea (69), Spain (51), Sri Lanka (1), Sudan (1), Sweden (12), Switzerland (5), Thailand (7), Trinidad and Tobago (1), Tunisia (2), Turkey (55), United Kingdom (49), United States (180), Venezuela (1), and Vietnam (1).

EDITORS-IN-CHIEF

Stephen C Strom, *Stockholm*
Andrzej S Tarnawski, *Long Beach*
Damian Garcia-Olmo, *Madrid*

ASSOCIATE EDITORS

Yung-Jue Bang, *Seoul*
Vincent Di Martino, *Besancon*
Daniel T Farkas, *Bronx*
Roberto J Firpi, *Gainesville*
Maria Gazouli, *Athens*
Chung-Feng Huang, *Kaohsiung*
Namir Katkhouda, *Los Angeles*
Anna Kramvis, *Johannesburg*
Wolfgang Kruis, *Cologne*
Peter L Lakatos, *Budapest*
Han Chu Lee, *Seoul*
Christine McDonald, *Cleveland*
Nahum Mendez-Sanchez, *Mexico City*
George K Michalopoulos, *Pittsburgh*
Suk Woo Nam, *Seoul*
Shu-You Peng, *Hangzhou*
Daniel von Renteln, *Montreal*
Angelo Sangiovanni, *Milan*
Hildegard M Schuller, *Knoxville*
Dong-Wan Seo, *Seoul*
Adrian John Stanley, *Glasgow*
Jurgen Stein, *Frankfurt*
Bei-Cheng Sun, *Nanjing*
Yoshio Yamaoka, *Yufu*

GUEST EDITORIAL BOARD MEMBERS

Jia-Ming Chang, *Taipei*
Jane CJ Chao, *Taipei*

Kuen-Feng Chen, *Taipei*
Tai-An Chiang, *Tainan*
Yi-You Chiou, *Taipei*
Seng-Kee Chuah, *Kaohsiung*
Wan-Long Chuang, *Kaohsiung*
How-Ran Guo, *Tainan*
Ming-Chih Hou, *Taipei*
Po-Shiuan Hsieh, *Taipei*
Ching-Chuan Hsieh, *Chiayi county*
Jun-Te Hsu, *Taoyuan*
Chung-Ping Hsu, *Taichung*
Chien-Ching Hung, *Taipei*
Chao-Hung Hung, *Kaohsiung*
Chen-Guo Ker, *Kaohsiung*
Yung-Chih Lai, *Taipei*
Teng-Yu Lee, *Taichung City*
Wei-Jei Lee, *Taoyuan*
Jin-Ching Lee, *Kaohsiung*
Jen-Kou Lin, *Taipei*
Ya-Wen Lin, *Taipei*
Hui-kang Liu, *Taipei*
Min-Hsiung Pan, *Taipei*
Bor-Shyang Sheu, *Tainan*
Hon-Yi Shi, *Kaohsiung*
Fung-Chang Sung, *Taichung*
Dar-In Tai, *Taipei*
Jung-Fa Tsai, *Kaohsiung*
Yao-Chou Tsai, *New Taipei City*
Chih-Chi Wang, *Kaohsiung*
Liang-Shun Wang, *New Taipei City*
Hsiu-Po Wang, *Taipei*
Jaw-Yuan Wang, *Kaohsiung*
Yuan-Huang Wang, *Taipei*
Yuan-Chuen Wang, *Taichung*

Deng-Chyang Wu, *Kaohsiung*
Shun-Fa Yang, *Taichung*
Hsu-Heng Yen, *Changhua*

MEMBERS OF THE EDITORIAL BOARD



Algeria

Saadi Berkane, *Algiers*
Samir Rouabhia, *Batna*



Argentina

N Tolosa de Talamoni, *Córdoba*
Eduardo de Santibanes, *Buenos Aires*
Bernardo Frider, *Capital Federal*
Guillermo Mazzolini, *Pilar*
Carlos Jose Pirola, *Buenos Aires*
Bernabé Matías Quesada, *Buenos Aires*
María Fernanda Troncoso, *Buenos Aires*



Australia

Golo Ahlenstiel, *Westmead*
Minoti V Apte, *Sydney*
Jacqueline S Barrett, *Melbourne*
Michael Beard, *Adelaide*
Filip Braet, *Sydney*
Guy D Eslick, *Sydney*
Christine Feinle-Bisset, *Adelaide*
Mark D Gorrell, *Sydney*
Michael Horowitz, *Adelaide*

Gordon Stanley Howarth, *Roseworthy*
 Seungha Kang, *Brisbane*
 Alfred King Lam, *Gold Coast*
 Ian C Lawrance, *Perth/Fremantle*
 Barbara Anne Leggett, *Brisbane*
 Daniel A Lemberg, *Sydney*
 Rupert W Leong, *Sydney*
 Finlay A Macrae, *Victoria*
 Vance Matthews, *Melbourne*
 David L Morris, *Sydney*
 Reme Mountifield, *Bedford Park*
 Hans J Netter, *Melbourne*
 Nam Q Nguyen, *Adelaide*
 Liang Qiao, *Westmead*
 Rajvinder Singh, *Adelaide*
 Ross Cyril Smith, *St Leonards*
 Kevin J Spring, *Sydney*
 Debbie Trinder, *Fremantle*
 Daniel R van Langenberg, *Box Hill*
 David Ian Watson, *Adelaide*
 Desmond Yip, *Garran*
 Li Zhang, *Sydney*



Austria

Felix Aigner, *Innsbruck*
 Gabriela A Berlakovich, *Vienna*
 Herwig R Cerwenka, *Graz*
 Peter Ferenci, *Wien*
 Alfred Gangl, *Vienna*
 Kurt Lenz, *Linz*
 Markus Peck-Radosavljevic, *Vienna*
 Markus Raderer, *Vienna*
 Stefan Riss, *Vienna*



Belgium

Michael George Adler, *Brussels*
 Benedicte Y De Winter, *Antwerp*
 Mark De Ridder, *Jette*
 Olivier Detry, *Liege*
 Denis Dufrane Dufrane, *Brussels*
 Sven M Francque, *Edegem*
 Nikos Kotzampassakis, *Liège*
 Geert KMM Robaey, *Genk*
 Xavier Sagaert, *Leuven*
 Peter Starkel, *Brussels*
 Eddie Wisse, *Keerbergen*



Brazil

SMP Balzan, *Santa Cruz do Sul*
 JLF Caboclo, *Sao Jose do Rio Preto*
 Fábio Guilherme Campos, *Sao Paulo*
 Claudia RL Cardoso, *Rio de Janeiro*
 Roberto J Carvalho-Filho, *Sao Paulo*
 Carla Daltro, *Salvador*
 José Sebastiao dos Santos, *Ribeirão Preto*
 Eduardo LR Mello, *Rio de Janeiro*
 Stihela Maria Murad-Regadas, *Fortaleza*
 Claudia PMS Oliveira, *Sao Paulo*
 Júlio C Pereira-Lima, *Porto Alegre*
 Marcos V Perini, *Sao Paulo*
 Vietla Satyanarayana Rao, *Fortaleza*

Raquel Rocha, *Salvador*
 AC Simoes e Silva, *Belo Horizonte*
 Mauricio F Silva, *Porto Alegre*
 Aytan Miranda Sipahi, *Sao Paulo*
 Rosa Leonôra Salerno Soares, *Niterói*
 Cristiane Valle Tovo, *Porto Alegre*
 Eduardo Garcia Vilela, *Belo Horizonte*



Brunei Darussalam

Vui Heng Chong, *Bandar Seri Begawan*



Bulgaria

Tanya Kirilova Kadiyska, *Sofia*
 Mihaela Petrova, *Sofia*



Cambodia

Francois Rouet, *Phnom Penh*



Canada

Brian Bressler, *Vancouver*
 Frank J Burczynski, *Winnipeg*
 Wangxue Chen, *Ottawa*
 Francesco Crea, *Vancouver*
 Jane A Foster, *Hamilton*
 Hugh J Freeman, *Vancouver*
 Shahrokh M Ghobadloo, *Ottawa*
 Yuewen Gong, *Winnipeg*
 Philip H Gordon, *Quebec*
 Rakesh Kumar, *Edmonton*
 Wolfgang A Kunze, *Hamilton*
 Patrick Labonte, *Laval*
 Zhikang Peng, *Winnipeg*
 Jayadev Raju, *Ottawa*
 Maitreyi Raman, *Calgary*
 Giada Sebastiani, *Montreal*
 Maida J Sewitch, *Montreal*
 Eldon A Shaffer, *Alberta*
 Christopher W Teshima, *Edmonton*
 Jean Sévigny, *Québec*
 Pingchang Yang, *Hamilton*
 Pingchang Yang, *Hamilton*
 Eric M Yoshida, *Vancouver*
 Bin Zheng, *Edmonton*



Chile

Marcelo A Beltran, *La Serena*
 Flavio Nervi, *Santiago*
 Adolfo Parra-Blanco, *Santiago*
 Alejandro Soza, *Santiago*



China

Zhao-Xiang Bian, *Hong Kong*
 San-Jun Cai, *Shanghai*
 Guang-Wen Cao, *Shanghai*
 Long Chen, *Nanjing*
 Ru-Fu Chen, *Guangzhou*
 George G Chen, *Hong Kong*

Li-Bo Chen, *Wuhan*
 Jia-Xu Chen, *Beijing*
 Hong-Song Chen, *Beijing*
 Lin Chen, *Beijing*
 Yang-Chao Chen, *Hong Kong*
 Zhen Chen, *Shanghai*
 Ying-Sheng Cheng, *Shanghai*
 Kent-Man Chu, *Hong Kong*
 Zhi-Jun Dai, *Xi'an*
 Jing-Yu Deng, *Tianjin*
 Yi-Qi Du, *Shanghai*
 Zhi Du, *Tianjin*
 Hani El-Nezami, *Hong Kong*
 Bao-Ying Fei, *Hangzhou*
 Chang-Ming Gao, *Nanjing*
 Jian-Ping Gong, *Chongqing*
 Zuo-Jiong Gong, *Wuhan*
 Jing-Shan Gong, *Shenzhen*
 Guo-Li Gu, *Beijing*
 Yong-Song Guan, *Chengdu*
 Mao-Lin Guo, *Luoyang*
 Jun-Ming Guo, *Ningbo*
 Yan-Mei Guo, *Shanghai*
 Xiao-Zhong Guo, *Shenyang*
 Guo-Hong Han, *Xi'an*
 Ming-Liang He, *Hong Kong*
 Peng Hou, *Xi'an*
 Zhao-Hui Huang, *Wuxi*
 Feng Ji, *Hangzhou*
 Simon Law, *Hong Kong*
 Yan-Chang Lei, *Hangzhou*
 Yu-Yuan Li, *Guangzhou*
 Meng-Sen Li, *Haikou*
 Shu-De Li, *Shanghai*
 Zong-Fang Li, *Xi'an*
 Qing-Quan Li, *Shanghai*
 Kang Li, *Lasa*
 Han Liang, *Tianjin*
 Xing'e Liu, *Hangzhou*
 Zheng-Wen Liu, *Xi'an*
 Xiao-Fang Liu, *Yantai*
 Bin Liu, *Tianjin*
 Quan-Da Liu, *Beijing*
 Hai-Feng Liu, *Beijing*
 Fei Liu, *Shanghai*
 Ai-Guo Lu, *Shanghai*
 He-Sheng Luo, *Wuhan*
 Xiao-Peng Ma, *Shanghai*
 Yong Meng, *Shantou*
 Ke-Jun Nan, *Xi'an*
 Siew Chien Ng, *Hong Kong*
 Simon SM Ng, *Hong Kong*
 Zhao-Shan Niu, *Qingdao*
 Di Qu, *Shanghai*
 Ju-Wei Mu, *Beijing*
 Rui-Hua Shi, *Nanjing*
 Bao-Min Shi, *Shanghai*
 Xiao-Dong Sun, *Hangzhou*
 Si-Yu Sun, *Shenyang*
 Guang-Hong Tan, *Haikou*
 Wen-Fu Tang, *Chengdu*
 Anthony YB Teoh, *Hong Kong*
 Wei-Dong Tong, *Chongqing*
 Eric Tse, *Hong Kong*
 Hong Tu, *Shanghai*

Rong Tu, *Haikou*
 Jian-She Wang, *Shanghai*
 Kai Wang, *Jinan*
 Xiao-Ping Wang, *Xianyang*
 Xiu-Yan Wang, *Shanghai*
 Dao-Rong Wang, *Yangzhou*
 De-Sheng Wang, *Xi'an*
 Chun-You Wang, *Wuhan*
 Ge Wang, *Chongqing*
 Xi-Shan Wang, *Harbin*
 Wei-hong Wang, *Beijing*
 Zhen-Ning Wang, *Shenyang*
 Wai Man Raymond Wong, *Hong Kong*
 Chun-Ming Wong, *Hong Kong*
 Jian Wu, *Shanghai*
 Sheng-Li Wu, *Xi'an*
 Wu-Jun Wu, *Xi'an*
 Qing Xia, *Chengdu*
 Yan Xin, *Shenyang*
 Dong-Ping Xu, *Beijing*
 Jian-Min Xu, *Shanghai*
 Wei Xu, *Changchun*
 Ming Yan, *Jinan*
 Xin-Min Yan, *Kunming*
 Yi-Qun Yan, *Shanghai*
 Feng Yang, *Shanghai*
 Yong-Ping Yang, *Beijing*
 He-Rui Yao, *Guangzhou*
 Thomas Yau, *Hong Kong*
 Winnie Yeo, *Hong Kong*
 Jing You, *Kunming*
 Jian-Qing Yu, *Wuhan*
 Ying-Yan Yu, *Shanghai*
 Wei-Zheng Yang, *Chengdu*
 Zong-Ming Zhang, *Beijing*
 Dian-Liang Zhang, *Qingdao*
 Ya-Ping Zhang, *Shijiazhuang*
 You-Cheng Zhang, *Lanzhou*
 Jian-Zhong Zhang, *Beijing*
 Ji-Yuan Zhang, *Beijing*
 Hai-Tao Zhao, *Beijing*
 Jian Zhao, *Shanghai*
 Jian-Hong Zhong, *Nanning*
 Ying-Qiang Zhong, *Guangzhou*
 Ping-Hong Zhou, *Shanghai*
 Yan-Ming Zhou, *Xiamen*
 Tong Zhou, *Nanchong*
 Li-Ming Zhou, *Chengdu*
 Guo-Xiong Zhou, *Nantong*
 Feng-Shang Zhu, *Shanghai*
 Jiang-Fan Zhu, *Shanghai*
 Zhao-Hui Zhu, *Beijing*



Croatia

Tajana Filipec Kanizaj, *Zagreb*
 Mario Tadic, *Zagreb*



Cuba

Damian Casadesus, *Havana*



Czech

Jan Bures, *Hradec Kralove*
 Marcela Kopacova, *Hradec Kralove*

Otto Kucera, *Hradec Kralove*
 Marek Minarik, *Prague*
 Pavel Soucek, *Prague*
 Miroslav Zavoral, *Prague*



Denmark

Vibeke Andersen, *Odense*
 E Michael Danielsen, *Copenhagen*



Egypt

Mohamed MM Abdel-Latif, *Assiut*
 Hussein Atta, *Cairo*
 Ashraf Elbahrawy, *Cairo*
 Mortada Hassan El-Shabrawi, *Cairo*
 Mona El Said El-Raziky, *Cairo*
 Elrashdy M Redwan, *New Borg Alrab*
 Zeinab Nabil Ahmed Said, *Cairo*
 Ragaa HM Salama, *Assiut*
 Maha Maher Shehata, *Mansoura*



Estonia

Margus Lember, *Tartu*
 Tamara Vorobjova, *Tartu*



Finland

Marko Kalliomäki, *Turku*
 Thomas Kietzmann, *Oulu*
 Kaija-Leena Kolho, *Helsinki*
 Eija Korkeila, *Turku*
 Heikki Makisalo, *Helsinki*
 Tanja Pessi, *Tampere*



France

Armando Abergel Clermont, *Ferrand*
 Elie K Chouillard, *Polssy*
 Pierre Cordelier, *Toulouse*
 Pascal P Crenn, *Garches*
 Catherine Daniel, *Lille*
 Fanny Daniel, *Paris*
 Cedric Dray, *Toulouse*
 Benoit Foligne, *Lille*
 Jean-Noel Freund, *Strasbourg*
 Hervé Guillou, *Toulouse*
 Nathalie Janel, *Paris*
 Majid Khatib, *Bordeaux*
 Jacques Marescaux, *Strasbourg*
 Jean-Claude Marie, *Paris*
 Driffa Moussata, *Pierre Benite*
 Hang Nguyen, *Clermont-Ferrand*
 Hugo Perazzo, *Paris*
 Alain L Servin, *Chatenay-Malabry*
 Chang Xian Zhang, *Lyon*



Germany

Stavros A Antoniou, *Monchengladbach*
 Erwin Biecker, *Siegburg*
 Hubert E Blum, *Freiburg*

Thomas Bock, *Berlin*
 Katja Breitkopf-Heinlein, *Mannheim*
 Elke Cario, *Essen*
 Güralp Onur Ceyhan, *Munich*
 Angel Cid-Arregui, *Heidelberg*
 Michael Clemens Roggendorf, *München*
 Christoph F Dietrich, *Bad Mergentheim*
 Valentin Fuhrmann, *Hamburg*
 Nikolaus Gassler, *Aachen*
 Andreas Geier, *Wuerzburg*
 Markus Gerhard, *Munich*
 Anton Gillissen, *Muenster*
 Thorsten Oliver Goetze, *Offenbach*
 Daniel Nils Gotthardt, *Heidelberg*
 Robert Grützmann, *Dresden*
 Thilo Hackert, *Heidelberg*
 Claus Hellerbrand, *Regensburg*
 Harald Peter Hoensch, *Darmstadt*
 Jens Hoeppner, *Freiburg*
 Richard Hummel, *Muenster*
 Jakob Robert Izbicki, *Hamburg*
 Gernot Maximilian Kaiser, *Essen*
 Matthias Kapischke, *Hamburg*
 Michael Keese, *Frankfurt*
 Andrej Khandoga, *Munich*
 Jorg Kleeff, *Munich*
 Alfred Koenigsrainer, *Tuebingen*
 Peter Christopher Konturek, *Saalfeld*
 Michael Linnebacher, *Rostock*
 Stefan Maier, *Kaufbeuren*
 Oliver Mann, *Hamburg*
 Marc E Martignoni, *Munic*
 Thomas Minor, *Bonn*
 Oliver Moeschler, *Osnabrueck*
 Jonas Mudter, *Eutin*
 Sebastian Mueller, *Heidelberg*
 Matthias Ocker, *Berlin*
 Andreas Ommer, *Essen*
 Albrecht Piiper, *Frankfurt*
 Esther Raskopf, *Bonn*
 Christoph Reichel, *Bad Brückenau*
 Elke Roeb, *Giessen*
 Udo Rolle, *Frankfurt*
 Karl-Herbert Schafer, *Zweibrücken*
 Peter Schemmer, *Heidelberg*
 Andreas G Schreyer, *Regensburg*
 Manuel A Silva, *Penzberg*
 Georgios C Sotiropoulos, *Essen*
 Ulrike S Stein, *Berlin*
 Dirk Uhlmann, *Leipzig*
 Michael Weiss, *Halle*
 Hong-Lei Weng, *Mannheim*
 Karsten Wursthorn, *Hamburg*



Greece

Alexandra Alexopoulou, *Athens*
 Nikolaos Antonakopoulos, *Athens*
 Stelios F Assimakopoulos, *Patras*
 Grigoris Chatzimavroudis, *Thessaloniki*
 Evangelos Cholongitas, *Thessaloniki*
 Gregory Christodoulidis, *Larisa*
 George N Dalekos, *Larisa*
 Urania Georgopoulou, *Athens*
 Eleni Gigi, *Thessaloniki*

Stavros Gourgiotis, *Athens*
 Leontios J Hadjileontiadis, *Thessaloniki*
 Thomas Hyphantis, *Ioannina*
 Ioannis Kanellos, *Thessaloniki*
 Stylianos Karatapanis, *Rhodes*
 Michael Koutsilieris, *Athens*
 Spiros D Ladas, *Athens*
 Theodoros K Liakakos, *Athens*
 Emanuel K Manesis, *Athens*
 Spiliot Manolakopoulos, *Athens*
 Gerassimos John Mantzaris, *Athens*
 Athanasios D Marinis, *Piraeus*
 Nikolaos Ioannis Nikiteas, *Athens*
 Konstantinos X Papamichael, *Athens*
 George Sgourakis, *Athens*
 Konstantinos C Thomopoulos, *Patras*
 Konstantinos Triantafyllou, *Athens*
 Christos Triantos, *Patras*
 Georgios Zacharakis, *Athens*
 Petros Zezos, *Alexandroupolis*
 Demosthenes E Ziogas, *Ioannina*



Guatemala

Carlos Maria Parellada, *Guatemala*



Hungary

Mihaly Boros, *Szeged*
 Tamás Decsi, *Pécs*
 Gyula Farkas, *Szeged*
 Andrea Furka, *Debrecen*
 Y vette Mandi, *Szeged*
 Peter L Lakatos, *Budapest*
 Pal Miheller, *Budapest*
 Tamás Molnar, *Szeged*
 Attila Olah, *Gyor*
 Maria Papp, *Debrecen*
 Ferenc Sipos, *Budapest*
 Miklós Tanyi, *Debrecen*
 Tibor Wittmann, *Szeged*



Iceland

Tryggvi Bjorn Stefánsson, *Reykjavík*



Indiad

Brij B Agarwal, *New Delhi*
 Deepak N Amarapurkar, *Mumbai*
 Shams ul Bari, *Srinagar*
 Sriparna Basu, *Varanasi*
 Runu Chakravarty, *Kolkata*
 Devendra C Desai, *Mumbai*
 Nutan D Desai, *Mumbai*
 Suneela Sunil Dhaneshwar, *Pune*
 Radha K Dhiman, *Chandigarh*
 Pankaj Garg, *Mohali*
 Uday C Ghoshal, *Lucknow*
 Kalpesh Jani, *Vadodara*
 Premashis Kar, *New Delhi*
 Jyotdeep Kaur, *Chandigarh*
 Rakesh Kochhar, *Chandigarh*
 Pradyumna K Mishra, *Mumbai*

Asish K Mukhopadhyay, *Kolkata*
 Imtiyaz Murtaza, *Srinagar*
 P Nagarajan, *New Delhi*
 Samiran Nundy, *Delhi*
 Gopal Pande, *Hyderabad*
 Benjamin Perakath, *Vellore*
 Arun Prasad, *New Delhi*
 D Nageshwar Reddy, *Hyderabad*
 Lekha Saha, *Chandigarh*
 Sundeep Singh Saluja, *New Delhi*
 Mahesh Prakash Sharma, *New Delhi*
 Sadiq Saleem Sikora, *Bangalore*
 Sarman Singh, *New Delhi*
 Rajeev Sinha, *Jhansi*
 Rupjyoti Talukdar, *Hyderabad*
 Rakesh Kumar Tandon, *New Delhi*
 Narayanan Thirumoorthy, *Coimbatore*



Indonesia

David Handoyo Muljono, *Jakarta*
 Andi Utama, *Jakarta*



Iran

Arezoo Aghakhani, *Tehran*
 Seyed Mohsen Dehghani, *Shiraz*
 Ahad Eshraghian, *Shiraz*
 Hossein Khedmat, *Tehran*
 Sadegh Massarrat, *Tehran*
 Marjan Mohammadi, *Tehran*
 Roja Rahimi, *Tehran*
 Farzaneh Sabahi, *Tehran*
 Majid Sadeghizadeh, *Tehran*
 Farideh Siavoshi, *Tehran*



Ireland

Gary Alan Bass, *Dublin*
 David J Brayden, *Dublin*
 Ronan A Cahill, *Dublin*
 Glen A Doherty, *Dublin*
 Liam J Fanning, *Cork*
 Barry Philip McMahon, *Dublin*
 RossMcManus, *Dublin*
 Dervla O'Malley, *Cork*
 Sinead M Smith, *Dublin*



Israel

Dan Carter, *Ramat Gan*
 Jorge-Shmuel Delgado, *Metar*
 Eli Magen, *Ashdod*
 Nitsan Maharshak, *Tel Aviv*
 Shaul Mordechai, *Beer Sheva*
 Menachem Moshkowitz, *Tel Aviv*
 William Bahij Nseir, *Nazareth*
 Shimon Reif, *Jerusalem*
 Ram Reifen, *Rehovot*
 Ariella Bar-Gil Shitrit, *Jerusalem*
 Noam Shussman, *Jerusalem*
 Igor Sukhotnik, *Haifa*
 Nir Wasserberg, *Petach Tikva*
 Jacob Yahav, *Rehovot*

Doron Levi Zamir, *Gedera*
 Shira Zelber-Sagi, *Haifa*
 Romy Zemel, *Petach-Tikva*



Italy

Ludovico Abenavoli, *Catanzaro*
 Luigi Elio Adinolfi, *Naples*
 Carlo Virginio Agostoni, *Milan*
 Anna Alisi, *Rome*
 Piero Luigi Almasio, *Palermo*
 Donato Francesco Altomare, *Bari*
 Amedeo Amedei, *Florence*
 Pietro Andreone, *Bologna*
 Imerio Angriman, *Padova*
 Vito Annese, *Florence*
 Paolo Aurello, *Rome*
 Salvatore Auricchio, *Naples*
 Gian Luca Baiocchi, *Brescia*
 Gianpaolo Balzano, *Milan*
 Antonio Basoli, *Rome*
 Gabrio Bassotti, *San Sisto*
 Mauro Bernardi, *Bologna*
 Alberto Biondi, *Rome*
 Ennio Biscaldi, *Genova*
 Massimo Bolognesi, *Padua*
 Luigi Bonavina, *Milano*
 Aldo Bove, *Chieti*
 Raffaele Bruno, *Pavia*
 Luigi Bruscianno, *Napoli*
 Giuseppe Cabibbo, *Palermo*
 Carlo Calabrese, *Bologna*
 Daniele Calistri, *Meldola*
 Vincenza Calvaruso, *Palermo*
 Lorenzo Camellini, *Reggio Emilia*
 Marco Candela, *Bologna*
 Raffaele Capasso, *Naples*
 Lucia Carulli, *Modena*
 Renato David Caviglia, *Rome*
 Luigina Cellini, *Chieti*
 Giuseppe Chiarioni, *Verona*
 Claudio Chiesa, *Rome*
 Michele Cicala, *Roma*
 Rachele Ciccocioppo, *Pavia*
 Sandro Contini, *Parma*
 Gaetano Corso, *Foggia*
 Renato Costi, *Parma*
 Alessandro Cucchetti, *Bologna*
 Rosario Cuomo, *Napoli*
 Giuseppe Currò, *Messina*
 Paola De Nardi, *Milano*
 Giovanni D De Palma, *Naples*
 Raffaele De Palma, *Napoli*
 Giuseppina De Petro, *Brescia*
 Valli De Re, *Aviano*
 Paolo De Simone, *Pisa*
 Giuliana Decorti, *Trieste*
 Emanuele Miraglia del Giudice, *Napoli*
 Isidoro Di Carlo, *Catania*
 Matteo Nicola Dario Di Minno, *Naples*
 Massimo Donadelli, *Verona*
 Mirko D'Onofrio, *Verona*
 Maria Pina Dore, *Sassari*
 Luca Elli, *Milano*
 Massimiliano Fabozzi, *Aosta*
 Massimo Falconi, *Ancona*

Ezio Falletto, *Turin*
 Silvia Fargion, *Milan*
 Matteo Fassan, *Verona*
 Gianfranco Delle Fave, *Roma*
 Alessandro Federico, *Naples*
 Francesco Feo, *Sassari*
 Davide Festi, *Bologna*
 Natale Figura, *Siena*
 Vincenzo Formica, *Rome*
 Mirella Fraquelli, *Milan*
 Marzio Frazzoni, *Modena*
 Walter Fries, *Messina*
 Gennaro Galizia, *Naples*
 Andrea Galli, *Florence*
 Matteo Garcovich, *Rome*
 Eugenio Gaudio, *Rome*
 Paola Ghiorzo, *Genoa*
 Edoardo G Giannini, *Genova*
 Luca Gianotti, *Monza*
 Maria Cecilia Giron, *Padova*
 Alberto Grassi, *Rimini*
 Gabriele Grassi, *Trieste*
 Francesco Greco, *Bergamo*
 Luigi Greco, *Naples*
 Antonio Grieco, *Rome*
 Fabio Grizzi, *Rozzano*
 Laurino Grossi, *Pescara*
 Simone Guglielmetti, *Milan*
 Tiberiu Hershcovici, *Jerusalem*
 Calogero Iacono, *Verona*
 Enzo Ierardi, *Bari*
 Amedeo Indriolo, *Bergamo*
 Raffaele Iorio, *Naples*
 Paola Iovino, *Salerno*
 Angelo A Izzo, *Naples*
 Loretta Kondili, *Rome*
 Filippo La Torre, *Rome*
 Giuseppe La Torre, *Rome*
 Giovanni Latella, *L'Aquila*
 Salvatore Leonardi, *Catania*
 Massimo Libra, *Catania*
 Anna Licata, *Palermo*
 Carmela Loguercio, *Naples*
 Amedeo Lonardo, *Modena*
 Carmelo Luigiano, *Catania*
 Francesco Luzzo, *Catanzaro*
 Giovanni Maconi, *Milano*
 Antonio Macrì, *Messina*
 Mariano Malaguarnera, *Catania*
 Francesco Manguso, *Napoli*
 Tommaso Maria Manzia, *Rome*
 Daniele Marrelli, *Siena*
 Gabriele Masselli, *Rome*
 Sara Massironi, *Milan*
 Giuseppe Mazzarella, *Avellino*
 Michele Milella, *Rome*
 Giovanni Milito, *Rome*
 Antonella d'Arminio Monforte, *Milan*
 Fabrizio Montecucco, *Genoa*
 Giovanni Monteleone, *Rome*
 Mario Morino, *Torino*
 Vincenzo La Mura, *Milan*
 Gerardo Nardone, *Naples*
 Riccardo Nascimbeni, *Brescia*
 Gabriella Nesi, *Florence*
 Giuseppe Nigri, *Rome*

Erica Novo, *Turin*
 Veronica Ojetti, *Rome*
 Michele Orditura, *Naples*
 Fabio Pace, *Seriate*
 Lucia Pacifico, *Rome*
 Omero Alessandro Paoluzi, *Rome*
 Valerio Pazienza, *San Giovanni Rotondo*
 Rinaldo Pellicano, *Turin*
 Adriano M Pellicelli, *Rome*
 Nadia Peparini, *Ciampino*
 Mario Pescatori, *Rome*
 Antonio Picardi, *Rome*
 Alberto Pilotto, *Padova*
 Alberto Piperno, *Monza*
 Anna Chiara Piscaglia, *Rome*
 Maurizio Pompili, *Rome*
 Francesca Romana Ponziani, *Rome*
 Cosimo Prantero, *Rome*
 Girolamo Ranieri, *Bari*
 Carlo Ratto, *Tome*
 Barbara Renga, *Perugia*
 Alessandro Repici, *Rozzano*
 Maria Elena Riccioni, *Rome*
 Lucia Ricci-Vitiani, *Rome*
 Luciana Rigoli, *Messina*
 Mario Rizzetto, *Torino*
 Ballarin Roberto, *Modena*
 Roberto G Romanelli, *Florence*
 Claudio Romano, *Messina*
 Luca Roncucci, *Modena*
 Cesare Ruffolo, *Treviso*
 Lucia Sacchetti, *Napoli*
 Rodolfo Sacco, *Pisa*
 Lapo Sali, *Florence*
 Romina Salpini, *Rome*
 Giulio Aniello, *Santoro Treviso*
 Armando Santoro, *Rozzano*
 Edoardo Savarino, *Padua*
 Marco Senzolo, *Padua*
 Annalucia Serafino, *Rome*
 Giuseppe S Sica, *Rome*
 Pierpaolo Sileri, *Rome*
 Cosimo Sperti, *Padua*
 Vincenzo Stanghellini, *Bologna*
 Cristina Stasi, *Florence*
 Gabriele Stocco, *Trieste*
 Roberto Tarquini, *Florence*
 Mario Testini, *Bari*
 Guido Torzilli, *Milan*
 Guido Alberto Massimo, *Tiberio Brescia*
 Giuseppe Toffoli, *Aviano*
 Alberto Tommasini, *Trieste*
 Francesco Tonelli, *Florence*
 Cesare Tosetti Porretta, *Terme*
 Lucio Trevisani, *Cona*
 Guglielmo M Trovato, *Catania*
 Mariapia Vairetti, *Pavia*
 Luca Vittorio Valenti, *Milano*
 Mariateresa T Ventura, *Bari*
 Giuseppe Verlato, *Verona*
 Marco Vivarelli, *Ancona*
 Giovanni Li Volti, *Catania*
 Giuseppe Zanotti, *Padua*
 Vincenzo Zara, *Lecce*
 Gianguglielmo Zehender, *Milan*
 Anna Linda Zignego, *Florence*
 Rocco Antonio Zoccali, *Messina*

Angelo Zullo, *Rome*



Japan

Yasushi Adachi, *Sapporo*
 Takafumi Ando, *Nagoya*
 Masahiro Arai, *Tokyo*
 Makoto Arai, *Chiba*
 Takaaki Arigami, *Kagoshima*
 Itaru Endo, *Yokohama*
 Munechika Enjoji, *Fukuoka*
 Shunji Fujimori, *Tokyo*
 Yasuhiro Fujino, *Akashi*
 Toshiyoshi Fujiwara, *Okayama*
 Yosuke Fukunaga, *Tokyo*
 Toshio Fukusato, *Tokyo*
 Takahisa Furuta, *Hamamatsu*
 Osamu Handa, *Kyoto*
 Naoki Hashimoto, *Osaka*
 Yoichi Hiasa, *Toon*
 Masatsugu Hiraki, *Saga*
 Satoshi Hirano, *Sapporo*
 Keiji Hirata, *Fukuoka*
 Toru Hiyama, *Higashihiroshima*
 Akira Hokama, *Nishihara*
 Shu Hoteya, *Tokyo*
 Masao Ichinose, *Wakayama*
 Tatsuya Ide, *Kurume*
 Masahiro Iizuka, *Akita*
 Toshiro Iizuka, *Tokyo*
 Kenichi Ikejima, *Tokyo*
 Tetsuya Ikemoto, *Tokushima*
 Hiroyuki Imaeda, *Saitama*
 Atsushi Imagawa, *Kan-onji*
 Hiroo Imazu, *Tokyo*
 Shuji Isaji, *Tsu*
 Toru Ishikawa, *Niigata*
 Toshiyuki Ishiwata, *Tokyo*
 Soichi Itaba, *Kitakyushu*
 Yoshiaki Iwasaki, *Okayama*
 Tatehiro Kagawa, *Isehara*
 Satoru Kakizaki, *Maebashi*
 Naomi Kakushima, *Shizuoka*
 Terumi Kamisawa, *Tokyo*
 Akihide Kamiya, *Isehara*
 Osamu Kanauchi, *Tokyo*
 Tatsuo Kanda, *Chiba*
 Shin Kariya, *Okayama*
 Shigeyuki Kawa, *Matsumoto*
 Takumi Kawaguchi, *Kurume*
 Takashi Kawai, *Tokyo*
 Soo Ryang Kim, *Kobe*
 Shinsuke Kiriya, *Gunma*
 Tsuneo Kitamura, *Urayasu*
 Masayuki Kitano, *Osakasayama*
 Hirotoshi Kobayashi, *Tokyo*
 Hironori Koga, *Kurume*
 Takashi Kojima, *Sapporo*
 Satoshi Kokura, *Kyoto*
 Shuhei Komatsu, *Kyoto*
 Tadashi Kondo, *Tokyo*
 Yasuteru Kondo, *Sendai*
 Yasuhiro Kuramitsu, *Yamaguchi*
 Yukinori Kurokawa, *Osaka*
 Shin Maeda, *Yokohama*
 Koutarou Maeda, *Toyoake*

Hitoshi Maruyama, *Chiba*
 Atsushi Masamune, *Sendai*
 Hiroyuki Matsubayashi, *Suntogun*
 Akihisa Matsuda, *Inzai*
 Hirofumi Matsui, *Tsukuba*
 Akira Matsumori, *Kyoto*
 Yoichi Matsuo, *Nagoya*
 Y Matsuzaki, *Ami*
 Toshihiro Mitaka, *Sapporo*
 Kouichi Miura, *Akita*
 Shinichi Miyagawa, *Matumoto*
 Eiji Miyoshi, *Suita*
 Toru Mizuguchi, *Sapporo*
 Nobumasa Mizuno, *Nagoya*
 Zenichi Morise, *Nagoya*
 Tomohiko Moriyama, *Fukuoka*
 Kunihiko Murase, *Tusima*
 Michihiro Mutoh, *Tsukiji*
 Akihito Nagahara, *Tokyo*
 Hikaru Nagahara, *Tokyo*
 Hidenari Nagai, *Tokyo*
 Koichi Nagata, *Shimotsuke-shi*
 Masaki Nagaya, *Kawasaki*
 Hisato Nakajima, *Nishi-Shinbashi*
 Toshifusa Nakajima, *Tokyo*
 Hiroshi Nakano, *Kawasaki*
 Hiroshi Nakase, *Kyoto*
 Toshiyuki Nakayama, *Nagasaki*
 Takahiro Nakazawa, *Nagoya*
 Shoji Natsugoe, *Kagoshima City*
 Tsutomu Nishida, *Suita*
 Shuji Nomoto, *Naogya*
 Sachiyo Nomura, *Tokyo*
 Takeshi Ogura, *Takatsukishi*
 Nobuhiro Ohkohchi, *Tsukuba*
 Toshifumi Ohkusa, *Kashiwa*
 Hirohide Ohnishi, *Akita*
 Teruo Okano, *Tokyo*
 Satoshi Osawa, *Hamamatsu*
 Motoyuki Otsuka, *Tokyo*
 Michitaka Ozaki, *Sapporo*
 Satoru Saito, *Yokohama*
 Naoaki Sakata, *Sendai*
 Ken Sato, *Maebashi*
 Toshiro Sato, *Tokyo*
 Tomoyuki Shibata, *Toyoake*
 Tomohiko Shimatani, *Kure*
 Yukihiro Shimizu, *Nanto*
 Tadashi Shimoyama, *Hirosaki*
 Masayuki Sho, *Nara*
 Ikuo Shoji, *Kobe*
 Atsushi Sofuni, *Tokyo*
 Takeshi Suda, *Niigata*
 M Sugimoto, *Hamamatsu*
 Ken Sugimoto, *Hamamatsu*
 Haruhiko Sugimura, *Hamamatsu*
 Shoichiro Sumi, *Kyoto*
 Hidekazu Suzuki, *Tokyo*
 Masahiro Tajika, *Nagoya*
 Hitoshi Takagi, *Takasaki*
 Toru Takahashi, *Niigata*
 Yoshihisa Takahashi, *Tokyo*
 Shinsuke Takeno, *Fukuoka*
 Akihiro Tamori, *Osaka*
 Kyosuke Tanaka, *Tsu*
 Shinji Tanaka, *Hiroshima*

Atsushi Tanaka, *Tokyo*
 Yasuhito Tanaka, *Nagoya*
 Shinji Tanaka, *Tokyo*
 Minoru Tomizawa, *Yotsukaido City*
 Kyoko Tsukiyama-Kohara, *Kagoshima*
 Takuya Watanabe, *Niigata*
 Kazuhiro Watanabe, *Sendai*
 Satoshi Yamagiwa, *Niigata*
 Takayuki Yamamoto, *Yokkaichi*
 Hiroshi Yamamoto, *Otsu*
 Kosho Yamanouchi, *Nagasaki*
 Ichiro Yasuda, *Gifu*
 Yutaka Yata, *Maebashi-city*
 Shin-ichi Yokota, *Sapporo*
 Norimasa Yoshida, *Kyoto*
 Hiroshi Yoshida, *Tama-City*
 Hitoshi Yoshiji, *Kashihara*
 Kazuhiko Yoshimatsu, *Tokyo*
 Kentaro Yoshioka, *Toyoake*
 Nobuhiro Zaima, *Nara*



Jordan

Khaled Ali Jadallah, *Irbid*



Kuwait

Islam Khan, *Kuwait*



Lebanon

Bassam N Abboud, *Beirut*
 Kassem A Barada, *Beirut*
 Marwan Ghosn, *Beirut*
 Iyad A Issa, *Beirut*
 Fadi H Mourad, *Beirut*
 AIA Sharara, *Beirut*
 Rita Slim, *Beirut*



Lithuania

Antanas Mickevicius, *Kaunas*



Malaysia

Huck Joo Tan, *Petaling Jaya*



Mexico

Richard A Awad, *Mexico City*
 Carlos R Camara-Lemarroy, *Monterrey*
 Norberto C Chavez-Tapia, *Mexico City*
 Wolfgang Gaertner, *Mexico City*
 Diego Garcia-Compean, *Monterrey*
 Arturo Panduro, *Guadalajara*
 OT Teramoto-Matsubara, *Mexico City*
 Felix Tellez-Avila, *Mexico City*
 Omar Vergara-Fernandez, *Mexico City*
 Saúl Villa-Trevino, *Cuidad de México*



Morocco

Samir Ahboucha, *Khouribga*



Netherlands

Robert J de Knegt, *Rotterdam*
 Tom Johannes Gerardus Gevers, *Nijmegen*
 Menno Hoekstra, *Leiden*
 BW Marcel Spanier, *Arnhem*
 Karel van Erpecum, *Utrecht*



New Zealand

Leo K Cheng, *Auckland*
 Andrew Stewart Day, *Christchurch*
 Jonathan Barnes Koea, *Auckland*
 Max Petrov, *Auckland*



Nigeria

Olufunmilayo Adenike Lesi, *Lagos*
 Jesse Abiodun Otegbayo, *Ibadan*
 Stella Ifeanyi Smith, *Lagos*



Norway

Trond Berg, *Oslo*
 Trond Arnulf Buanes, *Krokkleiva*
 Thomas de Lange, *Rud*
 Magdy El-Salhy, *Stord*
 Rasmus Goll, *Tromso*
 Dag Arne Lihaug Hoff, *Aalesund*



Pakistan

Zaigham Abbas, *Karachi*
 Usman A Ashfaq, *Faisalabad*
 Muhammad Adnan Bawany, *Hyderabad*
 Muhammad Idrees, *Lahore*
 Saeed Sadiq Hamid, *Karachi*
 Yasir Waheed, *Islamabad*



Poland

Thomas Brzozowski, *Cracow*
 Magdalena Chmiela, *Lodz*
 Krzysztof Jonderko, *Sosnowiec*
 Anna Kasicka-Jonderko, *Sosnowiec*
 Michal Kukla, *Katowice*
 Tomasz Hubert Mach, *Krakow*
 Agata Mulak, *Wroclaw*
 Danuta Owczarek, *Kraków*
 Piotr Socha, *Warsaw*
 Piotr Stalke, *Gdansk*
 Julian Teodor Swierczynski, *Gdansk*
 Anna M Zawilak-Pawlik, *Wroclaw*



Portugal

Marie Isabelle Cremers, *Setubal*
 Ceu Figueiredo, *Porto*
 Ana Isabel Lopes, *Lisbon*
 M Paula Macedo, *Lisboa*
 Ricardo Marcos, *Porto*
 Rui T Marinho, *Lisboa*
 Guida Portela-Gomes, *Estoril*

Filipa F Vale, *Lisbon*



Puerto Rico

Caroline B Appleyard, *Ponce*



Qatar

Abdulbari Bener, *Doha*



Romania

Mihai Ciocirlan, *Bucharest*

Dan Lucian Dumitrascu, *Cluj-Napoca*

Carmen Fierbinteanu-Braticevici, *Bucharest*

Romeo G Mihaila, *Sibiu*

Lucian Negreanu, *Bucharest*

Adrian Saftoiu, *Craiova*

Andrada Seicean, *Cluj-Napoca*

Ioan Sporea, *Timisoara*

Letiția Adela Maria Streba, *Craiova*

Anca Trifan, *Iasi*



Russia

Victor Pasechnikov, *Stavropol*

Vasiliy Ivanovich Reshetnyak, *Moscow*

Vitaly Skoropad, *Obninsk*



Saudi Arabia

Abdul-Wahed N Meshikhes, *Dammam*

M Ezzedien Rabie, *Khamis Mushait*



Singapore

Brian KP Goh, *Singapore*

Richie Soong, *Singapore*

Ker-Kan Tan, *Singapore*

Kok-Yang Tan, *Singapore*

Yee-Joo Tan, *Singapore*

Mark Wong, *Singapore*

Hong Ping Xia, *Singapore*



Slovenia

Matjaz Homan, *Ljubljana*

Martina Perse, *Ljubljana*



South Korea

Sang Hoon Ahn, *Seoul*

Seung Hyuk Baik, *Seoul*

Soon Koo Baik, *Wonju*

Soo-Cheon Chae, *Iksan*

Byung-Ho Choe, *Daegu*

Suck Chei Choi, *Iksan*

Hoon Jai Chun, *Seoul*

Yeun-Jun Chung, *Seoul*

Young-Hwa Chung, *Seoul*

Ki-Baik Hahm, *Seongnam*

Sang Young Han, *Busan*

Seok Joo Han, *Seoul*

Seung-Heon Hong, *Iksan*

Jin-Hyeok Hwang, *Seoungnam*

Jeong Won Jang, *Seoul*

Jin-Young Jang, *Seoul*

Dae-Won Jun, *Seoul*

Young Do Jung, *Kwangju*

Gyeong Hoon Kang, *Seoul*

Sung-Bum Kang, *Seoul*

Koo Jeong Kang, *Daegu*

Ki Mun Kang, *Jinju*

Chang Moo Kang, *Seodaemun-gu*

Gwang Ha Kim, *Busan*

Sang Soo Kim, *Goyang-si*

Jin Cheon Kim, *Seoul*

Tae Il Kim, *Seoul*

Jin Hong Kim, *Suwon*

Kyung Mo Kim, *Seoul*

Kyongmin Kim, *Suwon*

Hyung-Ho Kim, *Seongnam*

Seoung Hoon Kim, *Goyang*

Sang Il Kim, *Seoul*

Hyun-Soo Kim, *Wonju*

Jung Mogg Kim, *Seoul*

Dong Yi Kim, *Gwangju*

Kyun-Hwan Kim, *Seoul*

Jong-Han Kim, *Ansan*

Sang Wun Kim, *Seoul*

Ja-Lok Ku, *Seoul*

Kyu Taek Lee, *Seoul*

Hae-Wan Lee, *Chuncheon*

Inchul Lee, *Seoul*

Jung Eun Lee, *Seoul*

Sang Chul Lee, *Daejeon*

Song Woo Lee, *Ansan-si*

Hyuk-Joon Lee, *Seoul*

Seong-Wook Lee, *Yongin*

Kil Yeon Lee, *Seoul*

Jong-Inn Lee, *Seoul*

Kyung A Lee, *Seoul*

Jong-Baeck Lim, *Seoul*

Eun-Yi Moon, *Seoul*

SH Noh, *Seoul*

Seung Woon Paik, *Seoul*

Won Sang Park, *Seoul*

Sung-Joo Park, *Iksan*

Kyung Sik Park, *Daegu*

Se Hoon Park, *Seoul*

Yoonkyung Park, *Gwangju*

Seung-Wan Ryu, *Daegu*

Il Han Song, *Cheonan*

Myeong Jun Song, *Daejeon*

Yun Kyoung Yim, *Daejeon*

Dae-Yeul Yu, *Daejeon*



Spain

Mariam Aguas, *Valencia*

Raul J Andrade, *Málaga*

Antonio Arroyo, *Elche*

Josep M Bordas, *Barcelona*

Lisardo Boscá, *Madrid*

Ricardo Robles Campos, *Murcia*

Jordi Camps, *Reus*

Carlos Cervera, *Barcelona*

Alfonso Clemente, *Granada*

Pilar Codoner-Franch, *Valencia*

Fernando J Corrales, *Pamplona*

Fermin Sánchez de Medina, *Granada*

Alberto Herreros de Tejada, *Majadahonda*

Enrique de-Madaria, *Alicante*

JE Dominguez-Munoz, *Santiago de Compostela*

Vicente Felipo, *Valencia*

CM Fernandez-Rodriguez, *Madrid*

Carmen Frontela-Saseta, *Murcia*

Julio Galvez, *Granada*

Maria Teresa García, *Vigo*

MI Garcia-Fernandez, *Málaga*

Emilio Gonzalez-Reimers, *La Laguna*

Marcel Jimenez, *Bellaterra*

Angel Lanas, *Zaragoza*

Juan Ramón Larrubia, *Guadalajara*

Antonio Lopez-Sanroman, *Madrid*

Vicente Lorenzo-Zuniga, *Badalona*

Alfredo J Lucendo, *Tomelloso*

Vicenta Soledad Martinez-Zorzano, *Vigo*

José Manuel Martin-Villa, *Madrid*

Julio Mayol, *Madrid*

Manuel Morales-Ruiz, *Barcelona*

Alfredo Moreno-Egea, *Murcia*

Albert Pares, *Barcelona*

Maria Pellise, *Barcelona*

José Perea, *Madrid*

Miguel Angel Plaza, *Zaragoza*

María J Pozo, *Cáceres*

Enrique Quintero, *La Laguna*

Jose M Ramia, *Madrid*

Francisco Rodriguez-Frias, *Barcelona*

Silvia Ruiz-Gaspa, *Barcelona*

Xavier Serra-Aracil, *Barcelona*

Vincent Soriano, *Madrid*

Javier Suarez, *Pamplona*

Carlos Taxonera, *Madrid*

M Isabel Torres, *Jaén*

Manuel Vazquez-Carrera, *Barcelona*

Benito Velayos, *Valladolid*

Silvia Vidal, *Barcelona*



Sri Lanka

Arjuna Priyadarsin De Silva, *Colombo*



Sudan

Ishag Adam, *Khartoum*



Sweden

Roland G Andersson, *Lund*

Bergthor Björnsson, *Linköping*

Johan Christopher Bohr, *Örebro*

Mauro D'Amato, *Stockholm*

Thomas Franzen, *Norrköping*

Evangelos Kalaitzakis, *Lund*

Riadh Sadik, *Gothenburg*

Per Anders Sandstrom, *Linköping*

Ervin Toth, *Malmö*

Konstantinos Tsimogiannis, *Vasteras*

Apostolos V Tsolakis, *Uppsala*

**Switzerland**

Gieri Cathomas, *Liestal*
Jean Louis Frossard, *Geneve*
Christian Toso, *Geneva*
Stephan Robert Vavricks, *Zurich*
Dominique Velin, *Lausanne*

**Thailand**

Thawatchai Akaraviputh, *Bangkok*
P Yoysungnoen Chintana, *Pathumthani*
Veerapol Kukongviriyapan, *Muang*
Vijitra Leardkamolkarn, *Bangkok*
Varut Lohsiriwat, *Bangkok*
Somchai Pinlaor, *Khaon Kaen*
D Wattanasirichaigoon, *Bangkok*

**Trinidad and Tobago**

B Shivananda Nayak, *Mount Hope*

**Tunisia**

Ibtissem Ghedira, *Sousse*
Lilia Zouiten-Mekki, *Tunis*

**Turkey**

Inci Alican, *Istanbul*
Mustafa Altindis, *Sakarya*
Mutay Aslan, *Antalya*
Oktar Asoglu, *Istanbul*
Yasemin Hatice Balaban, *Istanbul*
Metin Basaranoglu, *Ankara*
Yusuf Bayraktar, *Ankara*
Süleyman Bayram, *Adiyaman*
Ahmet Bilici, *Istanbul*
Ahmet Sedat Boyacioglu, *Ankara*
Züleyha Akkan Cetinkaya, *Kocaeli*
Cavit Col, *Bolu*
Yasar Colak, *Istanbul*
Cagatay Erden Daphan, *Kirikkale*
Mehmet Demir, *Hatay*
Ahmet Merih Dobrucali, *Istanbul*
Gülüm Ozlem Elpek, *Antalya*
Ayse Basak Engin, *Ankara*
Eren Ersoy, *Ankara*
Osman Ersoy, *Ankara*
Yusuf Ziya Erzin, *Istanbul*
Mukaddes Esrefoglu, *Istanbul*
Levent Filik, *Ankara*
Ozgur Harmanaci, *Ankara*
Koray Hekimoglu, *Ankara*
Abdurrahman Kadayifci, *Gaziantep*
Cem Kalayci, *Istanbul*
Selin Kapan, *Istanbul*
Huseyin Kayadibi, *Adana*
Sabahattin Kaymakoglu, *Istanbul*
Metin Kement, *Istanbul*
Mevlut Kurt, *Bolu*
Resat Ozaras, *Istanbul*
Elvan Ozbek, *Adapazari*

Cengiz Ozcan, *Mersin*
Hasan Ozen, *Ankara*
Halil Ozguc, *Bursa*
Mehmet Ozturk, *Izmir*
Orhan V Ozkan, *Sakarya*
Semra Paydas, *Adana*
Ozlem Durmaz Suoglu, *Istanbul*
Ilker Tasci, *Ankara*
Müge Tecder-ünal, *Ankara*
Mesut Tez, *Ankara*
Serdar Topaloglu, *Trabzon*
Murat Toruner, *Ankara*
Gokhan Tumgor, *Adana*
Oguz Uskudar, *Adana*
Mehmet Yalniz, *Elazig*
Mehmet Yaman, *Elazig*
Veli Yazisiz, *Antalya*
Yusuf Yilmaz, *Istanbul*
Ozlem Yilmaz, *Izmir*
Oya Yucel, *Istanbul*
Ilhami Yuksel, *Ankara*

**United Kingdom**

Nadeem Ahmad Afzal, *Southampton*
Navneet K Ahluwalia, *Stockport*
Yeng S Ang, *Lancashire*
Ramesh P Arasaradnam, *Coventry*
Ian Leonard Phillip Beales, *Norwich*
John Beynon, *Swansea*
Barbara Braden, *Oxford*
Simon Bramhall, *Birmingham*
Geoffrey Burnstock, *London*
Ian Chau, *Sutton*
Thean Soon Chew, *London*
Helen G Coleman, *Belfast*
Anil Dhawan, *London*
Sunil Dolwani, *Cardiff*
Piers Gatenby, *London*
Anil T George, *London*
Pasquale Giordano, *London*
Paul Henderson, *Edinburgh*
Georgina Louise Hold, *Aberdeen*
Stefan Hubscher, *Birmingham*
Robin D Hughes, *London*
Nusrat Husain, *Manchester*
Matt W Johnson, *Luton*
Konrad Koss, *Macclesfield*
Anastasios Koulaouzidis, *Edinburgh*
Simon Lal, *Salford*
John S Leeds, *Aberdeen*
JK K Limdi, *Manchester*
Hongxiang Liu, *Cambridge*
Michael Joseph McGarvey, *London*
Michael Anthony Mendall, *London*
Alexander H Mirnezami, *Southampton*
J Bernadette Moore, *Guildford*
Claudio Nicoletti, *Norwich*
Savvas Papagrigoriadis, *London*
Sylvia LF Pender, *Southampton*
David Mark Pritchard, *Liverpool*
James A Ross, *Edinburgh*
Kamran Rostami, *Worcester*
Xiong Z Ruan, *London*
Frank I Tovey, *London*
Dhiraj Tripathi, *Birmingham*

Vamsi R Velchuru, *Great Yarmouth*
Nicholas T Ventham, *Edinburgh*
Diego Vergani, *London*
Jack Westwood Winter, *Glasgow*
Terence Wong, *London*
Ling Yang, *Oxford*

**United States**

Daniel E Abbott, *Cincinnati*
Ghassan K Abou-Alfa, *New York*
Julian Abrams, *New York*
David William Adelson, *Los Angeles*
Jonathan Steven Alexander, *Shreveport*
Tauseef Ali, *Oklahoma City*
Mohamed R Ali, *Sacramento*
Rajagopal N Aravalli, *Minneapolis*
Hassan Ashktorab, *Washington*
Shashi Bala, *Worcester*
Charles F Barish, *Raleigh*
P Patrick Basu, *New York*
Robert L Bell, *Berkeley Heights*
David Bentrem, *Chicago*
Henry J Binder, *New Haven*
Joshua Bleier, *Philadelphia*
Wojciech Blonski, *Johnson City*
Kenneth Boorum, *Corvallis*
Brian Boulay, *Chicago*
Carla W Brady, *Durham*
Kyle E Brown, *Iowa City*
Adeel A Butt, *Pittsburgh*
Weibiao Cao, *Providence*
Andrea Castillo, *Cheney*
Fernando J Castro, *Weston*
Adam S Cheifetz, *Boston*
Xiaoxin Luke Chen, *Durham*
Ramsey Cheung, *Palo Alto*
Parimal Chowdhury, *Little Rock*
Edward John Ciccio, *New York*
Dahn L Clemens, *Omaha*
Yingzi Cong, *Galveston*
Laura Iris Cosen-Binker, *Boston*
Joseph John Cullen, *Iowa*
Mark J Czaja, *Bronx*
Mariana D Dabeva, *Bronx*
Christopher James Damman, *Seattle*
Isabelle G De Plaen, *Chicago*
Punita Dhawan, *Nashville*
Hui Dong, *La Jolla*
Wael El-Rifai, *Nashville*
Sukru H Emre, *New Haven*
Paul Feuerstadt, *Hamden*
Josef E Fischer, *Boston*
Laurie N Fishman, *Boston*
Joseph Che Forbi, *Atlanta*
Temitope Foster, *Atlanta*
Amy E Foxx-Orenstein, *Scottsdale*
Daniel E Freedberg, *New York*
Shai Friedland, *Palo Alto*
Virgilio George, *Indianapolis*
Ajay Goel, *Dallas*
Oliver Grundmann, *Gainesville*
Stefano Guandalini, *Chicago*
Chakshu Gupta, *St. Joseph*
Grigoriy E Gurvits, *New York*

Xiaonan Han, *Cincinnati*
 Mohamed Hassan, *Jackson*
 Martin Hauer-Jensen, *Little Rock*
 Koichi Hayano, *Boston*
 Yingli Hee, *Atlanta*
 Samuel B Ho, *San Diego*
 Jason Ken Hou, *Houston*
 Lifang Hou, *Chicago*
 K-Qin Hu, *Orange*
 Jamal A Ibdah, *Columbia*
 Robert Thomas Jensen, *Bethesda*
 Huanguang "Charlie" Jia, *Gainesville*
 Rome Jutabha, *Los Angeles*
 Andreas M Kaiser, *Los Angeles*
 Avinash Kambadakone, *Boston*
 David Edward Kaplan, *Philadelphia*
 Randeep Kashyap, *Rochester*
 Rashmi Kaul, *Tulsa*
 Ali Keshavarzian, *Chicago*
 Amir Maqbul Khan, *Marshall*
 Nabeel Hasan Khan, *New Orleans*
 Sahil Khanna, *Rochester*
 Kusum K Kharbanda, *Omaha*
 Hyun Sik Kim, *Pittsburgh*
 Joseph Kim, *Duarte*
 Jae S Kim, *Gainesville*
 Miran Kim, *Providence*
 Timothy R Koch, *Washington*
 Burton I Korelitz, *New York*
 Betsy Kren, *Minneapolis*
 Shiu-Ming Kuo, *Buffalo*
 Michelle Lai, *Boston*
 Andreas Larentzakis, *Boston*
 Edward Wolfgang Lee, *Los Angeles*
 Daniel A Leffler, *Boston*
 Michael Leitman, *New York*
 Suthat Liangpunsakul, *Indianapolis*
 Joseph K Lim, *New Haven*
 Elaine Y Lin, *Bronx*
 Henry C Lin, *Albuquerque*
 Rohit Loomba, *La Jolla*
 James David Luketich, *Pittsburgh*

Li Ma, *Stanford*
 Mohammad F Madhoun, *Oklahoma City*
 Thomas C Mahl, *Buffalo*
 Ashish Malhotra, *Bettendorf*
 Pranoti Mandrekar, *Worcester*
 John Marks, *Wynnewood*
 Wendy M Mars, *Pittsburgh*
 Julien Vahe Matricon, *San Antonio*
 Craig J McClain, *Louisville*
 Tamir Miloh, *Phoenix*
 Ayse Leyla Mindikoglu, *Baltimore*
 Huanbiao Mo, *Denton*
 Klaus Monkemuller, *Birmingham*
 John Morton, *Stanford*
 Adnan Muhammad, *Tampa*
 Michael J Nowicki, *Jackson*
 Patrick I Okolo, *Baltimore*
 Giuseppe Orlando, *Winston Salem*
 Natalia A Osona, *Omaha*
 Virendra N Pandey, *Newark*
 Mansour A Parsi, *Cleveland*
 Michael F Picco, *Jacksonville*
 Daniel S Pratt, *Boston*
 Xiaofa Qin, *Newark*
 Janardan K Reddy, *Chicago*
 Victor E Reyes, *Galveston*
 Jon Marc Rhoads, *Houston*
 Giulia Roda, *New York*
 Jean-Francois Armand Rossignol, *Tampa*
 Paul A Rufo, *Boston*
 Madhusudana Girija Sanal, *New York*
 Miguel Saps, *Chicago*
 Sushil Sarna, *Galveston*
 Ann O Scheimann, *Baltimore*
 Bernd Schnabl, *La Jolla*
 Matthew J Schuchert, *Pittsburgh*
 Ekihiro Seki, *La Jolla*
 Chanjuan Shi, *Nashville*
 David Quan Shih, *Los Angeles*
 Shadab A Siddiqi, *Orlando*
 William B Silverman, *Iowa City*
 Shashideep Singhal, *New York*

Bronislaw L Slomiany, *Newark*
 Steven F Solga, *Bethlehem*
 Byoung-Joon Song, *Bethesda*
 Dario Sorrentino, *Roanoke*
 Scott R Steele, *Fort Lewis*
 Branko Stefanovic, *Tallahassee*
 Arun Swaminath, *New York*
 Kazuaki Takabe, *Richmond*
 Naoki Tanaka, *Bethesda*
 Hans Ludger Tillmann, *Durham*
 George Triadafilopoulos, *Stanford*
 John Richardson Thompson, *Nashville*
 Andrew Ukleja, *Weston*
 Miranda AL van Tilburg, *Chapel Hill*
 Gilberto Vaughan, *Atlanta*
 Vijayakumar Velu, *Atlanta*
 Gebhard Wagener, *New York*
 Kasper Saonun Wang, *Los Angeles*
 Xiangbing Wang, *New Brunswick*
 Daoyan Wei, *Houston*
 Theodore H Welling, *Ann Arbor*
 C Mel Wilcox, *Birmingham*
 Jacqueline Lee Wolf, *Boston*
 Laura Ann Woollett, *Cincinnati*
 Harry Hua-Xiang Xia, *East Hanover*
 Wen Xie, *Pittsburgh*
 Guang Yu Yang, *Chicago*
 Michele T Yip-Schneider, *Indianapolis*
 Sam Zakhari, *Bethesda*
 Kezhong Zhang, *Detroit*
 Huiping Zhou, *Richmond*
 Xiao-Jian Zhou, *Cambridge*
 Richard Zubarik, *Burlington*



Venezuela

Miguel Angel Chiurillo, *Barquisimeto*



Vietnam

Van Bang Nguyen, *Hanoi*



EDITORIAL

- 5645 Direct-acting antiviral agents against hepatitis C virus and lipid metabolism

Kanda T, Moriyama M

REVIEW

- 5650 Liquid biopsy in patients with hepatocellular carcinoma: Circulating tumor cells and cell-free nucleic acids

Okajima W, Komatsu S, Ichikawa D, Miyamae M, Ohashi T, Imamura T, Kiuchi J, Nishibeppu K, Arita T, Konishi H, Shiozaki A, Moriumura R, Ikoma H, Okamoto K, Otsuji E

ORIGINAL ARTICLE

Basic Study

- 5669 Fluctuation of zonulin levels in blood vs stability of antibodies

Vojdani A, Vojdani E, Kharrazian D

- 5680 Effects of albumin/glutaraldehyde glue on healing of colonic anastomosis in rats

Despoudi K, Mantzoros I, Ioannidis O, Cheva A, Antoniou N, Konstantaras D, Symeonidis S, Pramateftakis MG, Kotidis E, Angelopoulos S, Tsalis K

- 5692 Cytoplasmic domain of tissue factor promotes liver fibrosis in mice

Knight V, Lourensz D, Tchongue J, Correia J, Tipping P, Sievert W

- 5700 *Schistosoma japonicum* attenuates dextran sodium sulfate-induced colitis in mice *via* reduction of endoplasmic reticulum stress

Liu Y, Ye Q, Liu YL, Kang J, Chen Y, Dong WG

- 5713 Metabolomic profiling for identification of metabolites and relevant pathways for taurine in hepatic stellate cells

Deng X, Liang XQ, Lu FG, Zhao XF, Fu L, Liang J

- 5722 Protective effects of *Foeniculum vulgare* root bark extract against carbon tetrachloride-induced hepatic fibrosis in mice

Zhang C, Tian X, Zhang K, Li GY, Wang HY, Wang JH

Retrospective Cohort Study

- 5732 Hypothesized summative anal physiology score correlates but poorly predicts incontinence severity

Young CJ, Zahid A, Koh CE, Young JM

- 5739 Minor endoscopic sphincterotomy followed by large balloon dilation for large choledocholith treatment
Xu XD, Chen B, Dai JJ, Qian JQ, Xu CF
- 5746 Diagnostic value of FIB-4, aspartate aminotransferase-to-platelet ratio index and liver stiffness measurement in hepatitis B virus-infected patients with persistently normal alanine aminotransferase
Tan YW, Zhou XB, Ye Y, He C, Ge GH
- Retrospective Study**
- 5755 Accuracy of endoscopic ultrasound-guided tissue acquisition in the evaluation of lymph node enlargement in the absence of an on-site pathologist
Chin YK, Iglesias-Garcia J, de la Iglesia D, Lariño-Noia J, Abdulkader-Nallib I, Lázare H, Rebolledo Olmedo S, Dominguez-Muñoz JE
- 5764 Doublecortin and CaM kinase-like-1 as an independent poor prognostic factor for resected pancreatic carcinoma
Nishio K, Kimura K, Amano R, Nakata B, Yamazoe S, Ohira G, Miura K, Kametani N, Tanaka H, Muguruma K, Hirakawa K, Ohira M
- 5773 Study to determine guidelines for pediatric colonoscopy
Yoshioka S, Takedatsu H, Fukunaga S, Kuwaki K, Yamasaki H, Yamauchi R, Mori A, Kawano H, Yanagi T, Mizuochi T, Ushijima K, Mitsuyama K, Tsuruta O, Torimura T
- 5780 Postoperative changes of manometry after restorative proctocolectomy in Korean ulcerative colitis patients
Oh SH, Yoon YS, Lee JL, Kim CW, Park IJ, Lim SB, Yu CS, Kim JC
- 5787 Threonine and tyrosine kinase may serve as a prognostic biomarker for gallbladder cancer
Xie Y, Lin JZ, Wang AQ, Xu WY, Long JY, Luo YF, Shi J, Liang ZY, Sang XT, Zhao HT
- 5798 Simple instruments facilitating achievement of transanal total mesorectal excision in male patients
Xu C, Song HY, Han SL, Ni SC, Zhang HX, Xing CG
- 5809 Donor-derived infections among Chinese donation after cardiac death liver recipients
Ye QF, Zhou W, Wan QQ

CASE REPORT

- 5817 Rarity among benign gastric tumors: Plexiform fibromyxoma - Report of two cases
Szurian K, Till H, Amerstorfer E, Hinteregger N, Mischinger HJ, Liegl-Atzwanger B, Brcic I
- 5823 Tegafur-uracil-induced rapid development of advanced hepatic fibrosis
Honda S, Sawada K, Hasebe T, Nakajima S, Fujiya M, Okumura T

ABOUT COVER

Editorial board member of *World Journal of Gastroenterology*, Shunji Fujimori, MD, PhD, Associate Professor, Department of Gastroenterology, Graduate School of Medicine, Nippon Medical School, Tokyo 113-8603, Japan

AIMS AND SCOPE

World Journal of Gastroenterology (*World J Gastroenterol*, *WJG*, print ISSN 1007-9327, online ISSN 2219-2840, DOI: 10.3748) is a peer-reviewed open access journal. *WJG* was established on October 1, 1995. It is published weekly on the 7th, 14th, 21st, and 28th each month. The *WJG* Editorial Board consists of 1375 experts in gastroenterology and hepatology from 68 countries.

The primary task of *WJG* is to rapidly publish high-quality original articles, reviews, and commentaries in the fields of gastroenterology, hepatology, gastrointestinal endoscopy, gastrointestinal surgery, hepatobiliary surgery, gastrointestinal oncology, gastrointestinal radiation oncology, gastrointestinal imaging, gastrointestinal interventional therapy, gastrointestinal infectious diseases, gastrointestinal pharmacology, gastrointestinal pathophysiology, gastrointestinal pathology, evidence-based medicine in gastroenterology, pancreatology, gastrointestinal laboratory medicine, gastrointestinal molecular biology, gastrointestinal immunology, gastrointestinal microbiology, gastrointestinal genetics, gastrointestinal translational medicine, gastrointestinal diagnostics, and gastrointestinal therapeutics. *WJG* is dedicated to become an influential and prestigious journal in gastroenterology and hepatology, to promote the development of above disciplines, and to improve the diagnostic and therapeutic skill and expertise of clinicians.

INDEXING/ABSTRACTING

World Journal of Gastroenterology (*WJG*) is now indexed in Current Contents[®]/Clinical Medicine, Science Citation Index Expanded (also known as SciSearch[®]), Journal Citation Reports[®], Index Medicus, MEDLINE, PubMed, PubMed Central and Directory of Open Access Journals. The 2017 edition of Journal Citation Reports[®] cites the 2016 impact factor for *WJG* as 3.365 (5-year impact factor: 3.176), ranking *WJG* as 29th among 79 journals in gastroenterology and hepatology (quartile in category Q2).

FLYLEAF

I-IX Editorial Board

EDITORS FOR THIS ISSUE

Responsible Assistant Editor: Xiang Li
Responsible Electronic Editor: Dan Li
Proofing Editor-in-Chief: Lian-Sheng Ma

Responsible Science Editor: Ze-Mao Gong
Proofing Editorial Office Director: Jin-Lei Wang

NAME OF JOURNAL
World Journal of Gastroenterology

ISSN
ISSN 1007-9327 (print)
ISSN 2219-2840 (online)

LAUNCH DATE
October 1, 1995

FREQUENCY
Weekly

EDITORS-IN-CHIEF
Damian Garcia-Olmo, MD, PhD, Doctor, Professor, Surgeon, Department of Surgery, Universidad Autonoma de Madrid; Department of General Surgery, Fundacion Jimenez Diaz University Hospital, Madrid 28040, Spain

Stephen C Strom, PhD, Professor, Department of Laboratory Medicine, Division of Pathology, Karolinska Institutet, Stockholm 141-86, Sweden

Andrzej S Tarnawski, MD, PhD, DSc (Med), Professor of Medicine, Chief Gastroenterology, VA Long Beach Health Care System, University of California, Irvine, CA, 5901 E. Seventh Str., Long Beach,

CA 90822, United States

EDITORIAL BOARD MEMBERS
All editorial board members resources online at <http://www.wjgnet.com/1007-9327/editorialboard.htm>

EDITORIAL OFFICE
Jin-Lei Wang, Director
Yuan Qi, Vice Director
Ze-Mao Gong, Vice Director
World Journal of Gastroenterology
Baishideng Publishing Group Inc
7901 Stoneridge Drive, Suite 501,
Pleasanton, CA 94588, USA
Telephone: +1-925-2238242
Fax: +1-925-2238243
E-mail: editorialoffice@wjgnet.com
Help Desk: <http://www.f6publishing.com/helpdesk>
<http://www.wjgnet.com>

PUBLISHER
Baishideng Publishing Group Inc
7901 Stoneridge Drive, Suite 501,
Pleasanton, CA 94588, USA
Telephone: +1-925-2238242
Fax: +1-925-2238243
E-mail: bpoffice@wjgnet.com
Help Desk: <http://www.f6publishing.com/helpdesk>

<http://www.wjgnet.com>

PUBLICATION DATE
August 21, 2017

COPYRIGHT
© 2017 Baishideng Publishing Group Inc. Articles published by this Open-Access journal are distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits use, distribution, and reproduction in any medium, provided the original work is properly cited, the use is non commercial and is otherwise in compliance with the license.

SPECIAL STATEMENT
All articles published in journals owned by the Baishideng Publishing Group (BPG) represent the views and opinions of their authors, and not the views, opinions or policies of the BPG, except where otherwise explicitly indicated.

INSTRUCTIONS TO AUTHORS
Full instructions are available online at <http://www.wjgnet.com/bpg/gerinfo/204>

ONLINE SUBMISSION
<http://www.f6publishing.com>

Direct-acting antiviral agents against hepatitis C virus and lipid metabolism

Tatsuo Kanda, Mitsuhiro Morioka

Tatsuo Kanda, Mitsuhiro Morioka, Division of Gastroenterology and Hepatology, Department of Medicine, Nihon University School of Medicine, Tokyo 173-8610, Japan

Author contributions: Kanda T and Morioka M contributed to all aspects of this paper.

Conflict-of-interest statement: Kanda T and Morioka M declare no conflict of interest related to this publication.

Open-Access: This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

Manuscript source: Invited manuscript

Correspondence to: Tatsuo Kanda, MD, PhD, Associate Professor, Division of Gastroenterology and Hepatology, Department of Medicine, Nihon University School of Medicine, 30-1 Otaguchi-Kamicho, Itabashi-ku, Tokyo 173-8610, Japan. kandat-cib@umin.ac.jp
Telephone: +81-3-39728111
Fax: +81-3-39568496

Received: May 26, 2017

Peer-review started: May 28, 2017

First decision: June 23, 2017

Revised: July 4, 2017

Accepted: July 22, 2017

Article in press: July 24, 2017

Published online: August 21, 2017

Abstract

Hepatitis C virus (HCV) infection induces steatosis and is accompanied by multiple metabolic alterations including hyperuricemia, reversible hypocholesterolemia

and insulin resistance. Total cholesterol, low-density lipoprotein-cholesterol and triglyceride levels are increased by peginterferon and ribavirin combination therapy when a sustained virologic response (SVR) is achieved in patients with HCV. Steatosis is significantly more common in patients with HCV genotype 3 but interferon-free regimens are not always effective for treating HCV genotype 3 infections. HCV infection increases fatty acid synthase levels, resulting in the accumulation of fatty acids in hepatocytes. Of note, low-density lipoprotein receptor, scavenger receptor class B type I and Niemann-Pick C1-like 1 proteins are candidate receptors that may be involved in HCV. They are also required for the uptake of cholesterol from the external environment of hepatocytes. Among HCV-infected patients with or without human immunodeficiency virus infection, changes in serum lipid profiles are observed during interferon-free treatment and after the achievement of an SVR. It is evident that HCV affects cholesterol metabolism during interferon-free regimens. Although higher SVR rates were achieved with interferon-free treatment of HCV, special attention must also be paid to unexpected adverse events based on host metabolic changes including hyperlipidemia.

Key words: Cholesterol; Hepatitis C virus; Interferon-free; Lipid metabolism

© **The Author(s) 2017.** Published by Baishideng Publishing Group Inc. All rights reserved.

Core tip: Eradication of hepatitis C virus (HCV) decreases the rate of complications, including liver-related and liver-unrelated death, and improves patient quality of life. Individuals infected with HCV have an increased risk of cardiovascular diseases and intracerebral hemorrhage, which are both associated with lipid metabolism. HCV infection causes abnormal host lipid metabolism. Treatment with interferon-based and interferon-free regimens has an impact on the

eradication of HCV, as well as lipid abnormalities, during treatment and after treatment. Further observations are needed to determine the long-term effects on lipid metabolism caused by HCV and by eradication of the virus.

Kanda T, Moriyama M. Direct-acting antiviral agents against hepatitis C virus and lipid metabolism. *World J Gastroenterol* 2017; 23(31): 5645-5649 Available from: URL: <http://www.wjgnet.com/1007-9327/full/v23/i31/5645.htm> DOI: <http://dx.doi.org/10.3748/wjg.v23.i31.5645>

INTRODUCTION

Hepatitis C virus (HCV) encodes at least 10 viral proteins, which include structural (core, E1, E2 and p7) and non-structural (NS2, NS3, NS4A, NS4B, NS5A and NS5B) proteins^[1]. HCV is a leading cause of cirrhosis and hepatocellular carcinoma in the United States and Japan. Eradication of HCV is important for preventing death due to these liver diseases.

Associations of HCV with host lipoproteins have been reported^[2]. Hepatocytes take up low-density lipoproteins (LDLs) and very low-density lipoproteins through LDL receptors. Antibodies to the HCV envelope may disrupt the HCV lipid-containing envelope^[3]. These antibodies could provide an efficient mode of viral entry into liver cells^[2]. HCV core protein colocalizes with apolipoprotein AII at the surface of lipid droplets, suggesting a relationship between the expression of HCV core protein and cellular lipid metabolism^[4]. HCV infection or core protein expression also increases the expression of sterol regulatory element binding protein 1c and its target, fatty acid synthase (FASN), which are both involved in lipid synthesis^[5].

Although interferon-free regimens could result in higher sustained virologic response (SVR) rates, Endo *et al*^[6] reported that serum cholesterol levels were significantly increased during combination treatment with the HCV NS5B inhibitor sofosbuvir and the HCV NS5A inhibitor ledipasvir, compared with those during interferon-included regimens^[7]. Of interest, the authors also observed that regardless of the regimens, total cholesterol, LDL cholesterol and high-density lipoprotein (HDL) cholesterol levels increased post-treatment^[6].

HCV AND LIPID METABOLISM

HCV increases FASN levels^[5], resulting in the accumulation of fatty acids in hepatocytes (Figure 1). Fatty acids are needed for cell growth, cell adhesion, extracellular matrix formation, cell migration and cell invasion, which are essential for cancer development. Synthesis of cholesterol requires 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase. Among

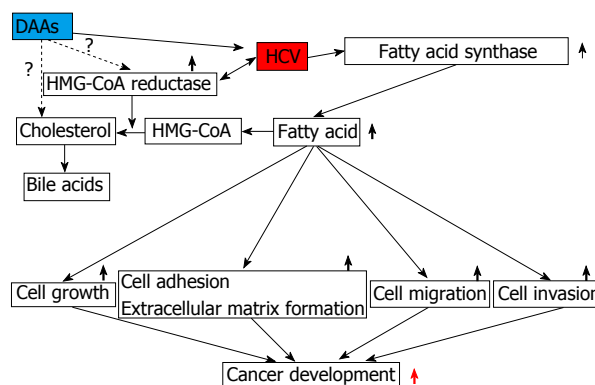


Figure 1 Hepatitis C virus and fatty acid synthesis. DAAs: Direct-acting antiviral agents; HCV: Hepatitis C virus; HMG-CoA, 3-hydroxy-3-methylglutaryl coenzyme A.

HMG-CoA reductase inhibitors, fluvastatin is an anti-HCV reagent that is used in combination with interferons^[8]. Steatosis and abnormal lipid metabolism caused by HCV infection may enhance lipid droplet formation in hepatocytes^[9-11]. Lipid droplets, which store neutral lipids, are required for the formation of infectious HCV particles^[11].

ADVANCED LIVER FIBROSIS AND LIPID METABOLISM

In most cells, the major source of new sterol is endogenous synthesis from acetyl-CoA^[12]. HMG-CoA is formed from acetyl-CoA and acetoacetyl-CoA^[12]. There are at least 4 mechanisms for acquiring cholesterol: (1) *de novo* synthesis within the cells and uptake of unesterified or esterified cholesterol from the external environment *via*; (2) the LDL receptor (LDLR); (3) scavenger receptor class B type I (SR-BI); or (4) Niemann-Pick C1-like 1 protein (NPC1L1)^[13]. HDL particles containing apoA-I can be bound by SR-BI in hepatocytes and endocrine cells^[13]. Interestingly, LDLR, SR-BI and NPC1L1 are candidate receptors that may be involved in HCV^[14-16].

The total cholesterol pool in a human is 2.2 g/kg body weight. There is a continuous flow of cholesterol from the endoplasmic reticulum to the cell membrane and then from the plasma membrane to the liver and intestine^[13]. In humans, the flux of cholesterol through the whole body is approximately 10 mg/d per kilogram body weight^[17], although the half-life of plasma cholesterol is only a few days^[13]. The serum lipids, total cholesterol, cholesteryl ester, LDL cholesterol and HDL cholesterol levels were significantly lower in HCV-related cirrhosis patients than in controls. HCV-related cirrhosis severely impairs liver lipid metabolism^[18] (Figure 2). The serum total cholesterol level is an independent predictor of significant fibrosis^[19]. When evaluating serum total cholesterol levels, liver function should also be checked (Figure 2).

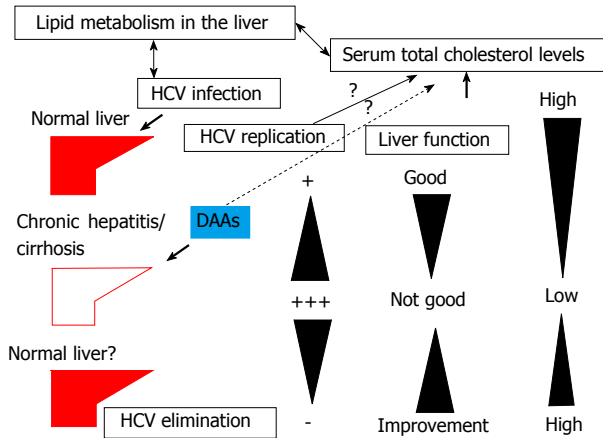


Figure 2 Effects of hepatitis C virus infection on liver function and liver lipid metabolism. DAAs: Direct-acting antiviral agents; HCV: Hepatitis C virus.

LIPID METABOLISM DURING TREATMENT WITH INTERFERON-BASED REGIMENS AGAINST HCV

Total cholesterol, LDL cholesterol and triglyceride levels are increased by peginterferon and ribavirin combination therapy when an SVR is achieved in patients with HCV genotype 1^[20]. HCV eradication is closely related to lipid metabolism in patients treated with interferon-based regimens. Lange *et al*^[21] examined the serum lipid profiles of 575 European HCV genotype 1-infected patients before, during and after treatment with peginterferon- α -2a (180 μ g/wk) and ribavirin (1000-1200 mg/d) for 48 wk. The authors found substantial pretreatment hypocholesterolemia with a nonresponse to interferon- α -based therapy, and lower pretreatment cholesterol levels were an independent predictor of not attaining an SVR^[21]. After treatment-induced HCV eradication, the median cholesterol levels increased above baseline. Kuo *et al*^[22] reported that chronic HCV infection is associated with hypocholesterolemia and hypotriglyceridemia, and these conditions can be reversed by successful antiviral therapy.

HCV GENOTYPE 3

Serfaty *et al*^[23] reported that hypobetalipoproteinemia is prevalent and associated with steatosis, especially in patients infected with HCV genotype 3. It has been reported that HCV, particularly genotype 3, is associated with steatosis. Poynard *et al*^[24] reported that an SVR, achieved with interferon-based regimens, is associated with a reduction in steatosis in HCV genotype 3 patients, as well as a correction of serum cholesterol levels at baseline. Steatosis is significantly more common in HCV genotype 3 patients than in those with other HCV genotypes, and in patients treated with peginterferon alpha-2a plus ribavirin, an SVR is associated with reduction of steatosis^[25]. New

treatments using HCV NS3/4A protease inhibitors have limited activity against HCV genotype 3^[26]. HCV NS5B and HCV NS5A inhibitors have also performed poorly in HCV genotype 3 patients^[26].

LIPID METABOLISM DURING TREATMENT WITH INTERFERON-FREE REGIMENS AGAINST HCV

Endo *et al*^[6] studied 276 patients with chronic HCV genotype 1b infection who were treated with interferon-free regimens. Of these 276 patients, 141 were treated with the HCV NS5A inhibitor daclatasvir plus the HCV NS3/4A inhibitor asunaprevir for 24 wk^[27,28] and 135 were treated with sofosbuvir plus ledipasvir for 12 wk^[6].

In the daclatasvir plus asunaprevir-SVR group, the total cholesterol levels were significantly increased throughout the observation period, and the total cholesterol levels were significantly increased at 4 wk after treatment and 12 wk after treatment, compared with those at the end of treatment (EOT)^[6]. Serum LDL cholesterol levels increased after the EOT. HDL cholesterol was significantly increased throughout the treatment period, but there were no significant changes in serum triglyceride levels^[6].

In the sofosbuvir plus ledipasvir-SVR group, the total cholesterol levels were markedly increased from the early stage of therapy and lasted until the EOT^[6]. The total cholesterol levels were sharply decreased after the EOT ($P < 0.001$). Changes in the LDL cholesterol levels were quite similar to those found in the total cholesterol levels. After the EOT, the HDL cholesterol levels were decreased compared to those during therapy ($P < 0.001$), but there were no significant changes in triglyceride levels^[6]. Hashimoto *et al*^[29] also reported that the increase in cholesterol levels during treatment was much greater in the sofosbuvir plus ledipasvir-SVR group than in daclatasvir plus asunaprevir-SVR group. The authors also observed that a rapid increase in the serum LDL cholesterol concentration during the interferon-free treatment was associated with the type of regimen and decrease in the HCV core protein level. Morales *et al*^[30] also reported that there was a significant increase in the LDL and total cholesterol levels after treatment, compared to the pre- and post-treatment laboratory data from 52 patients receiving sofosbuvir-based regimens, but there was no change in body mass index between pre- and post-treatment. Among HIV/HCV coinfecting patients, an increase in LDL cholesterol was observed after an SVR was achieved with interferon-free treatment^[31].

CONCLUSION

HCV infection induces steatosis and is accompanied by multiple metabolic alterations, such as hyperuricemia, reversible hypocholesterolemia, insulin resistance, arterial hypertension and visceral adipose tissue

expansion^[32-34]. Eradication of HCV with interferon-free regimens increases total cholesterol levels. Because of the worsening nutritional status as an adverse event of interferon-based regimens, it is difficult to examine the effects of HCV on serum lipid profiles^[6]. It is evident that HCV affects cholesterol metabolism during interferon-free regimens because these regimens have no influence on the nutritional status of the host^[6]. The increase in cholesterol levels during treatment was much greater in the sofosbuvir plus ledipasvir-SVR group than in the daclatasvir plus asunaprevir-SVR group^[6,29]. Although higher SVR rates were achieved with interferon-free treatment of HCV, special attention must also be paid to unexpected adverse events based on host metabolic changes.

REFERENCES

- 1 Kanda T, Imazeki F, Yokosuka O. New antiviral therapies for chronic hepatitis C. *Hepatol Int* 2010; **4**: 548-561 [PMID: 21063477 DOI: 10.1007/s12072-010-9193-3]
- 2 Prince AM, Huima-Byron T, Parker TS, Levine DM. Visualization of hepatitis C virions and putative defective interfering particles isolated from low-density lipoproteins. *J Viral Hepat* 1996; **3**: 11-17 [PMID: 8736235 DOI: 10.1111/j.1365-2893.1996.tb00075.x]
- 3 Hijikata M, Shimizu YK, Kato H, Iwamoto A, Shih JW, Alter HJ, Purcell RH, Yoshikura H. Equilibrium centrifugation studies of hepatitis C virus: evidence for circulating immune complexes. *J Virol* 1993; **67**: 1953-1958 [PMID: 8383220]
- 4 Barba G, Harper F, Harada T, Kohara M, Goulinet S, Matsuura Y, Eder G, Schaff Z, Chapman MJ, Miyamura T, Bréchet C. Hepatitis C virus core protein shows a cytoplasmic localization and associates to cellular lipid storage droplets. *Proc Natl Acad Sci USA* 1997; **94**: 1200-1205 [PMID: 9037030 DOI: 10.1073/pnas.94.4.1200]
- 5 Bose SK, Kim H, Meyer K, Wolins N, Davidson NO, Ray R. Forkhead box transcription factor regulation and lipid accumulation by hepatitis C virus. *J Virol* 2014; **88**: 4195-4203 [PMID: 24478438 DOI: 10.1128/JVI.03327-13]
- 6 Endo D, Satoh K, Shimada N, Hokari A, Aizawa Y. Impact of interferon-free antiviral therapy on lipid profiles in patients with chronic hepatitis C genotype 1b. *World J Gastroenterol* 2017; **23**: 2355-2364 [PMID: 28428715 DOI: 10.3748/wjg.v23.i13.2355]
- 7 Kanda T, Yasui S, Nakamura M, Suzuki E, Arai M, Ooka Y, Ogasawara S, Chiba T, Saito T, Haga Y, Takahashi K, Sasaki R, Wu S, Nakamoto S, Tawada A, Maruyama H, Imazeki F, Kato N, Yokosuka O. Real-World Experiences with the Combination Treatment of Ledipasvir plus Sofosbuvir for 12 Weeks in HCV Genotype 1-Infected Japanese Patients: Achievement of a Sustained Virological Response in Previous Users of Peginterferon plus Ribavirin with HCV NS3/4A Inhibitors. *Int J Mol Sci* 2017; **18**: 906 [PMID: 28441362 DOI: 10.3390/ijms18050906]
- 8 Ikeda M, Abe K, Yamada M, Dansako H, Naka K, Kato N. Different anti-HCV profiles of statins and their potential for combination therapy with interferon. *Hepatology* 2006; **44**: 117-125 [PMID: 16799963 DOI: 10.1002/hep.21232]
- 9 Moriya K, Yotsuyanagi H, Shintani Y, Fujie H, Ishibashi K, Matsuura Y, Miyamura T, Koike K. Hepatitis C virus core protein induces hepatic steatosis in transgenic mice. *J Gen Virol* 1997; **78** (Pt 7): 1527-1531 [PMID: 9225025 DOI: 10.1099/0022-1317-78-7-1527]
- 10 Nakamura M, Kanda T, Nakamoto S, Miyamura T, Jiang X, Wu S, Yokosuka O. No correlation between PNPLA3 rs738409 genotype and fatty liver and hepatic cirrhosis in Japanese patients with HCV. *PLoS One* 2013; **8**: e81312 [PMID: 24349054 DOI: 10.1371/journal.pone.0081312]
- 11 Miyanari Y, Atsuzawa K, Usuda N, Watashi K, Hishiki T, Zayas M, Bartenschlager R, Wakita T, Hijikata M, Shimotohno K. The lipid droplet is an important organelle for hepatitis C virus production. *Nat Cell Biol* 2007; **9**: 1089-1097 [PMID: 17721513 DOI: 10.1038/ncb1631]
- 12 Spady DK, Dietschy JM. Sterol synthesis in vivo in 18 tissues of the squirrel monkey, guinea pig, rabbit, hamster, and rat. *J Lipid Res* 1983; **24**: 303-315 [PMID: 6842086]
- 13 Dietschy JM, Turley SD. Thematic review series: brain Lipids. Cholesterol metabolism in the central nervous system during early development and in the mature animal. *J Lipid Res* 2004; **45**: 1375-1397 [PMID: 15254070 DOI: 10.1194/jlr.R400004-JLR200]
- 14 Monazahian M, Böhme I, Bonk S, Koch A, Scholz C, Grethe S, Thomssen R. Low density lipoprotein receptor as a candidate receptor for hepatitis C virus. *J Med Virol* 1999; **57**: 223-229 [PMID: 10022791]
- 15 Scarselli E, Ansuini H, Cerino R, Roccasecca RM, Acali S, Filocamo G, Traboni C, Nicosia A, Cortese R, Vitelli A. The human scavenger receptor class B type I is a novel candidate receptor for the hepatitis C virus. *EMBO J* 2002; **21**: 5017-5025 [PMID: 12356718 DOI: 10.1093/emboj/cdf529]
- 16 Sainz B Jr, Barretto N, Martin DN, Hiraga N, Imamura M, Hussain S, Marsh KA, Yu X, Chayama K, Alrefai WA, Uprichard SL. Identification of the Niemann-Pick C1-like 1 cholesterol absorption receptor as a new hepatitis C virus entry factor. *Nat Med* 2012; **18**: 281-285 [PMID: 22231557 DOI: 10.1038/nm.2581]
- 17 Orth M, Bellosta S. Cholesterol: its regulation and role in central nervous system disorders. *Cholesterol* 2012; **2012**: 292598 [PMID: 23119149 DOI: 10.1155/2012/292598]
- 18 Vere CC, Streba CT, Streba L, Rogoveanu I. Lipid serum profile in patients with viral liver cirrhosis. *Med Princ Pract* 2012; **21**: 566-568 [PMID: 22722340 DOI: 10.1159/000339206]
- 19 Sud A, Hui JM, Farrell GC, Bandara P, Kench JG, Fung C, Lin R, Samarasinghe D, Liddle C, McCaughan GW, George J. Improved prediction of fibrosis in chronic hepatitis C using measures of insulin resistance in a probability index. *Hepatology* 2004; **39**: 1239-1247 [PMID: 15122752 DOI: 10.1002/hep.20207]
- 20 Tada S, Saito H, Ebinuma H, Ojio K, Yamagishi Y, Kumagai N, Inagaki Y, Masuda T, Nishida J, Takahashi M, Nagata H, Hibi T. Treatment of hepatitis C virus with peg-interferon and ribavirin combination therapy significantly affects lipid metabolism. *Hepatol Res* 2009; **39**: 195-199 [PMID: 19054155 DOI: 10.1111/j.1872-034X.2008.00439.x]
- 21 Lange CM, von Wagner M, Bojunga J, Berg T, Farnik H, Hassler A, Sarrazin C, Herrmann E, Zeuzem S. Serum lipids in European chronic HCV genotype 1 patients during and after treatment with pegylated interferon- α -2a and ribavirin. *Eur J Gastroenterol Hepatol* 2010; **22**: 1303-1307 [PMID: 20729742 DOI: 10.1097/MEG.0b013e32833de92c]
- 22 Kuo YH, Chuang TW, Hung CH, Chen CH, Wang JH, Hu TH, Lu SN, Lee CM. Reversal of hypolipidemia in chronic hepatitis C patients after successful antiviral therapy. *J Formos Med Assoc* 2011; **110**: 363-371 [PMID: 21741004 DOI: 10.1016/S0929-6646(11)60054-5]
- 23 Serfaty L, Andreani T, Giral P, Carbonell N, Chazouillères O, Poupon R. Hepatitis C virus induced hypobetalipoproteinemia: a possible mechanism for steatosis in chronic hepatitis C. *J Hepatol* 2001; **34**: 428-434 [PMID: 11322205 DOI: 10.1016/S0168-8278(00)00036-2]
- 24 Poynard T, Ratziu V, McHutchison J, Manns M, Goodman Z, Zeuzem S, Younossi Z, Albrecht J. Effect of treatment with peginterferon or interferon alfa-2b and ribavirin on steatosis in patients infected with hepatitis C. *Hepatology* 2003; **38**: 75-85 [PMID: 12829989 DOI: 10.1053/jhep.2003.50267]
- 25 Reddy KR, Govindarajan S, Marcellin P, Bernstein D, Dienstag JL, Bodenheimer H Jr, Rakela J, Messinger D, Schmidt G, Ackrill A, Hadziyannis SJ. Hepatic steatosis in chronic hepatitis C: baseline host and viral characteristics and influence on response to therapy with peginterferon alpha-2a plus ribavirin. *J Viral*

- Hepat* 2008; **15**: 129-136 [PMID: 18184196 DOI: 10.1111/j.1365-2893.2007.00901.x]
- 26 **Ampuero J**, Romero-Gómez M, Reddy KR. Review article: HCV genotype 3 - the new treatment challenge. *Aliment Pharmacol Ther* 2014; **39**: 686-698 [PMID: 24612116 DOI: 10.1111/apt.12646]
 - 27 **Kumada H**, Suzuki Y, Ikeda K, Toyota J, Karino Y, Chayama K, Kawakami Y, Ido A, Yamamoto K, Takaguchi K, Izumi N, Koike K, Takehara T, Kawada N, Sata M, Miyagoshi H, Eley T, McPhee F, Damokosh A, Ishikawa H, Hughes E. Daclatasvir plus asunaprevir for chronic HCV genotype 1b infection. *Hepatology* 2014; **59**: 2083-2091 [PMID: 24604476 DOI: 10.1002/hep.27113]
 - 28 **Kanda T**, Yasui S, Nakamura M, Suzuki E, Arai M, Haga Y, Sasaki R, Wu S, Nakamoto S, Imazeki F, Yokosuka O. Daclatasvir plus Asunaprevir Treatment for Real-World HCV Genotype 1-Infected Patients in Japan. *Int J Med Sci* 2016; **13**: 418-423 [PMID: 27279790 DOI: 10.7150/ijms.15519]
 - 29 **Hashimoto S**, Yatsuhashi H, Abiru S, Yamasaki K, Komori A, Nagaoka S, Saeki A, Uchida S, Bekki S, Kugiyama Y, Nagata K, Nakamura M, Migita K, Nakao K. Rapid Increase in Serum Low-Density Lipoprotein Cholesterol Concentration during Hepatitis C Interferon-Free Treatment. *PLoS One* 2016; **11**: e0163644 [PMID: 27680885 DOI: 10.1371/journal.pone.0163644]
 - 30 **Morales AL**, Junga Z, Singla MB, Sjogren M, Torres D. Hepatitis C eradication with sofosbuvir leads to significant metabolic changes. *World J Hepatol* 2016; **8**: 1557-1563 [PMID: 28050236 DOI: 10.4254/wjh.v8.i35.1557]
 - 31 **Townsend K**, Meissner EG, Sidharthan S, Sampson M, Remaley AT, Tang L, Kohli A, Osinusi A, Masur H, Kottlilil S. Interferon-Free Treatment of Hepatitis C Virus in HIV/Hepatitis C Virus-Coinfected Subjects Results in Increased Serum Low-Density Lipoprotein Concentration. *AIDS Res Hum Retroviruses* 2016; **32**: 456-462 [PMID: 26559180 DOI: 10.1089/AID.2015.0170]
 - 32 **Lonardo A**, Adinolfi LE, Restivo L, Ballestri S, Romagnoli D, Baldelli E, Nascimbeni F, Loria P. Pathogenesis and significance of hepatitis C virus steatosis: an update on survival strategy of a successful pathogen. *World J Gastroenterol* 2014; **20**: 7089-7103 [PMID: 24966582 DOI: 10.3748/wjg.v20.i23.7089]
 - 33 **González-Reimers E**, Quintero-Platt G, Rodríguez-Gaspar M, Alemán-Valls R, Pérez-Hernández O, Santolaria-Fernández F. Liver steatosis in hepatitis C patients. *World J Hepatol* 2015; **7**: 1337-1346 [PMID: 26052379 DOI: 10.4254/wjh.v7.i10.1337]
 - 34 **Chang ML**. Metabolic alterations and hepatitis C: From bench to bedside. *World J Gastroenterol* 2016; **22**: 1461-1476 [PMID: 26819514 DOI: 10.3748/wjg.v22.i4.1461]

P- Reviewer: Guerrieri F, Ikura Y **S- Editor:** Qi Y **L- Editor:** A
E- Editor: Huang Y





Published by **Baishideng Publishing Group Inc**
7901 Stoneridge Drive, Suite 501, Pleasanton, CA 94588, USA
Telephone: +1-925-223-8242
Fax: +1-925-223-8243
E-mail: bpgoffice@wjgnet.com
Help Desk: <http://www.f6publishing.com/helpdesk>
<http://www.wjgnet.com>



ISSN 1007-9327

