Microvesicles and exosomes

Journal of
Extracellular Vesicles

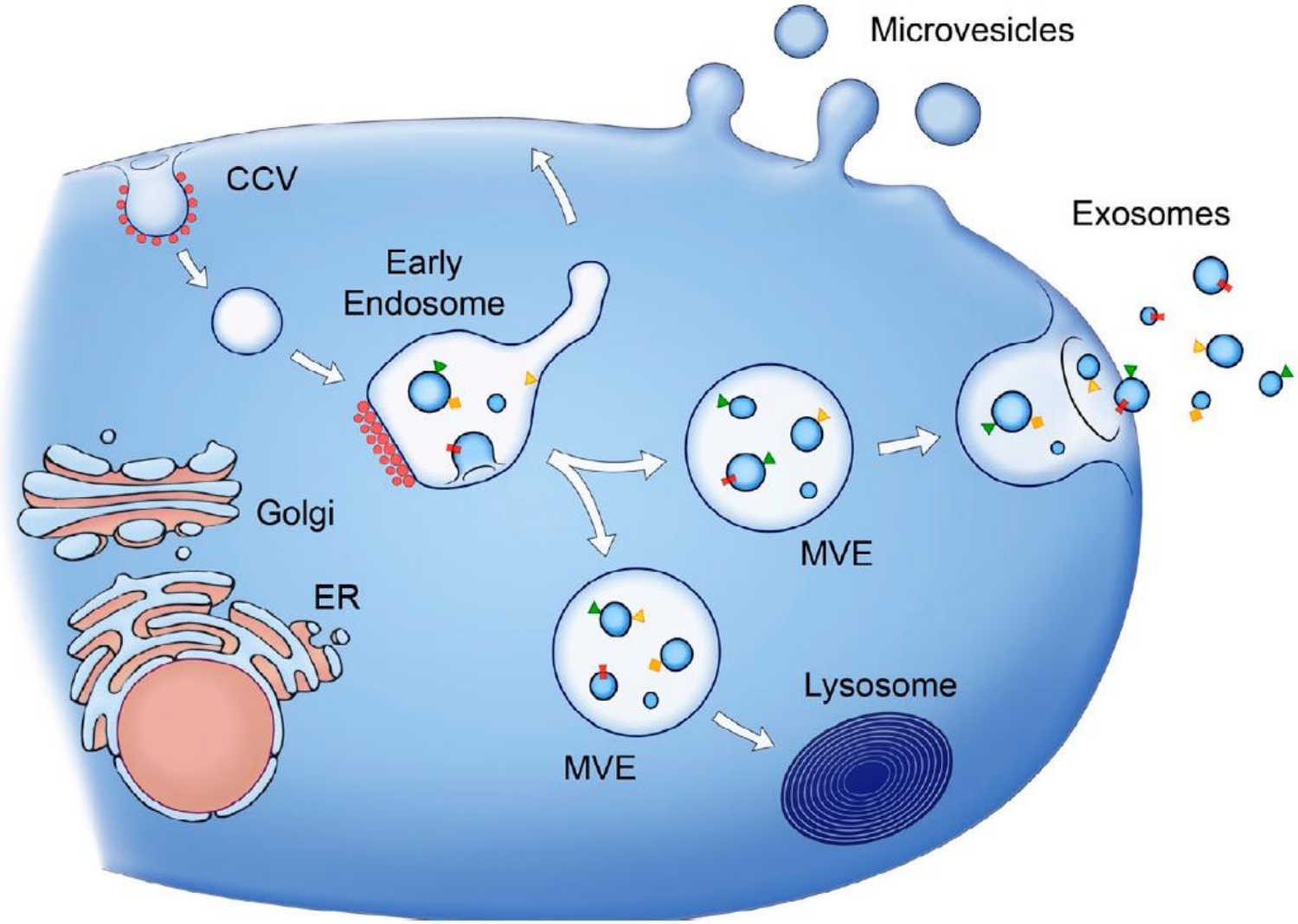
REVIEW ARTICLE

Biological properties of extracellular vesicles and their physiological functions

María Yáñez-Mó[1,2*#], Pia R.-M. Siljander[3,4*#], Zoraida Andreu[1,2], Apolonija Bedina Zavec[5], Francesc E. Borràs[6,7], Edit I. Buzas[8], Krisztina Buzas[9,10], Enriqueta Casal[11], Francesco Cappello[12,13], Joana Carvalho[14,15], Eva Colás[16], Anabela Cordeiro-da Silva[14,17,18], Stefano Fais[19], Juan M. Falcon-Perez[11,20], Irene M. Ghobrial[21], Bernd Giebel[22], Mario Gimona[23,24], Michael Graner[25], Ihsan Gursel[26], Mayda Gursel[27], Niels H. H. Heegaard[28,29], An Hendrix[30], Peter Kierulf[31], Katsutoshi Kokubun[21], Maja Kosanovic[32], Veronika Kralj-Iglic[33], Eva-Maria Krämer-Albers[34], Saara Laitinen[35], Cecilia Lässer[36], Thomas Lener[23,24], Erzsébet Ligeti[37], Aija Linē[38], Georg Lipps[39], Alicia Llorente[40], Jan Lötvall[36], Mateja Manček-Keber[41,42], Antonio Marcilla[43], Maria Mittelbrunn[44], Irina Nazarenko[45], Esther N.M. Nolte-'t Hoen[46], Tuula A. Nyman[47], Lorraine O'Driscoll[48], Mireia Olivan[16], Carla Oliveira[14,15,49], Éva Pállinger[8], Hernando A. del Portillo[50,51], Jaume Reventós[16,52], Marina Rigau[16], Eva Rohde[23,24], Marei Sammar[53], Francisco Sánchez-Madrid[44,54], N. Santarém[14,17], Katharina Schallmoser[23,24], Marie Stampe Ostenfeld[55], Willem Stoorvogel[46], Roman Stukelj[33], Susanne G. Van der Grein[46], M. Helena Vasconcelos[14,56,57], Marca H. M. Wauben[46] and Olivier De Wever[30]

From: Yanez-Mo et al, J Extracell Vesicles 4;27066 (215)

Microvesicle and exosome formation



From: Raposo & Stoorvogel, J Cell Biol 200;373 (2013)

Microvesicle and exosome characterisation

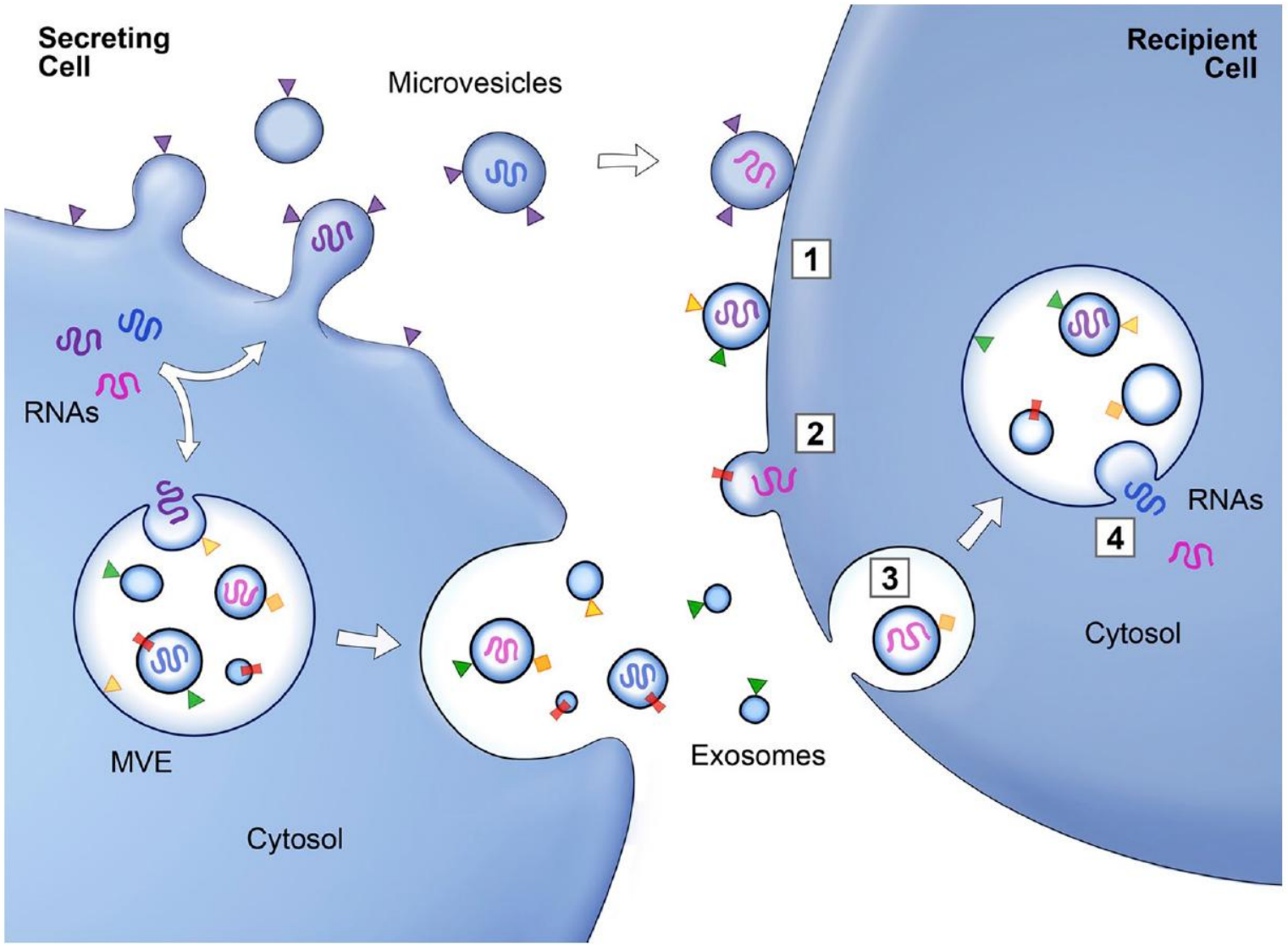
Table 1 Characteristics of exosomes and shedding microvesicles

	Exosomes	Shedding microvesicles
Size	30–100 nm	100–1000 nm
Lipid composition	Lysobisphosphatidic acid, low phosphatidylserine exposure, cholesterol, ceramide, contains lipid rafts, sphingomyelin, phosphatidylcholine, phosphatidyl-ethanolamine, ganglioside GM3, phosphatidylinositol	High phosphatidylserine exposure, cholesterol
Site of origin	MVBs	Plasma membrane
Mechanism of discharge	Exocytosis of MVBs	Budding from plasma membrane
Marker proteins	CD9, CD63, CD81, CD82, CD89, flotillin, annexin, hsp70, hsp90	Integrins, selectins, other antigens of parental cell
Composition	Proteins, RNAs, miRs	Proteins, RNAs, miRs
References	7,16–19,24,29,36,47	10,11,13,26–28,30,31,33,34,47,149,150

hsp, heat shock protein; miRs, microRNAs; MVBs, multivesicular bodies.

From: Husman & Holvoet, Cardiovasc Res 100;7 (2013)

Cell communication via microvesicles and exosomes



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Cell communication – other pathways

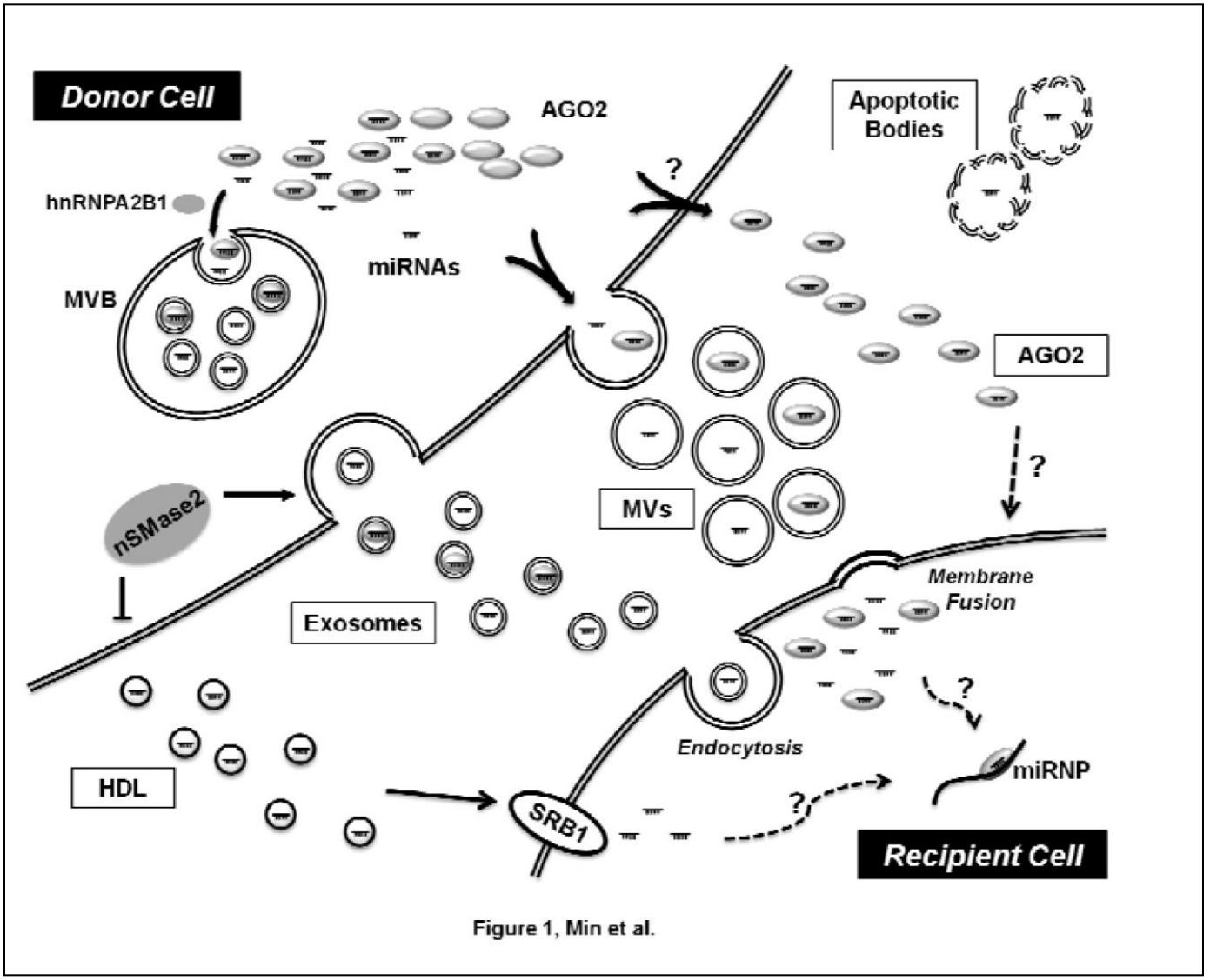
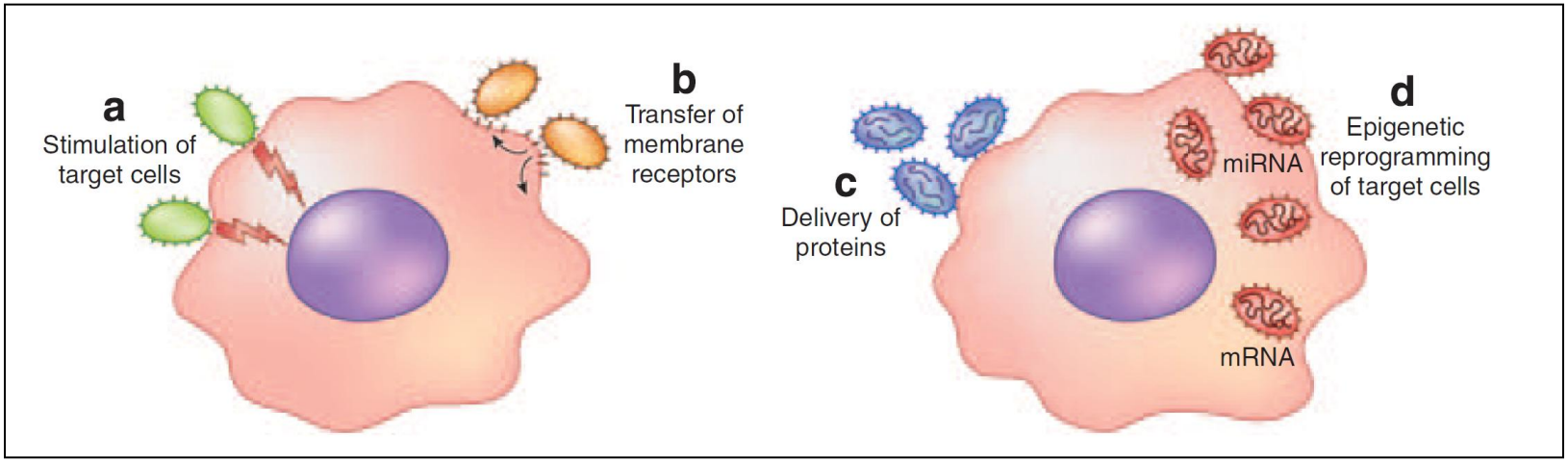


Figure 1, Min et al.

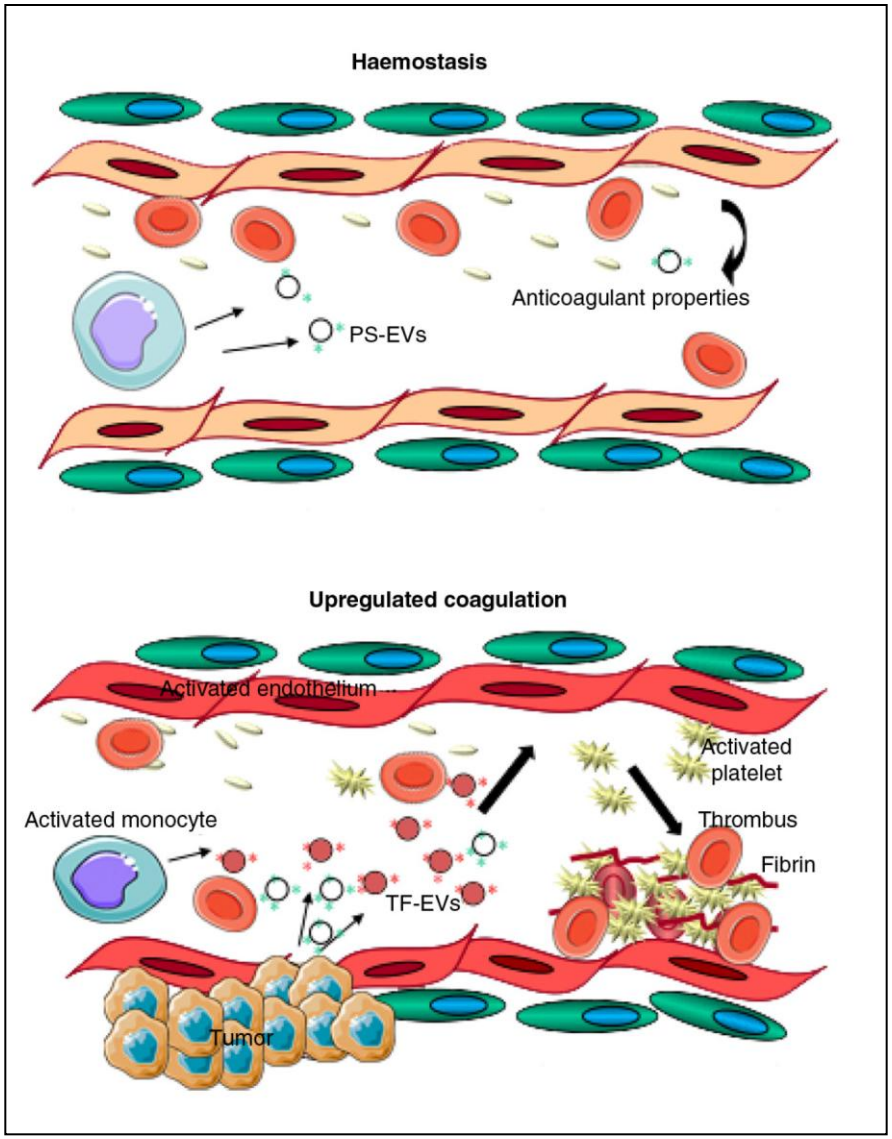
From: Min et al, Eur J Clin Invest 2015 (ahead of print)

Cell communication – signal delivery



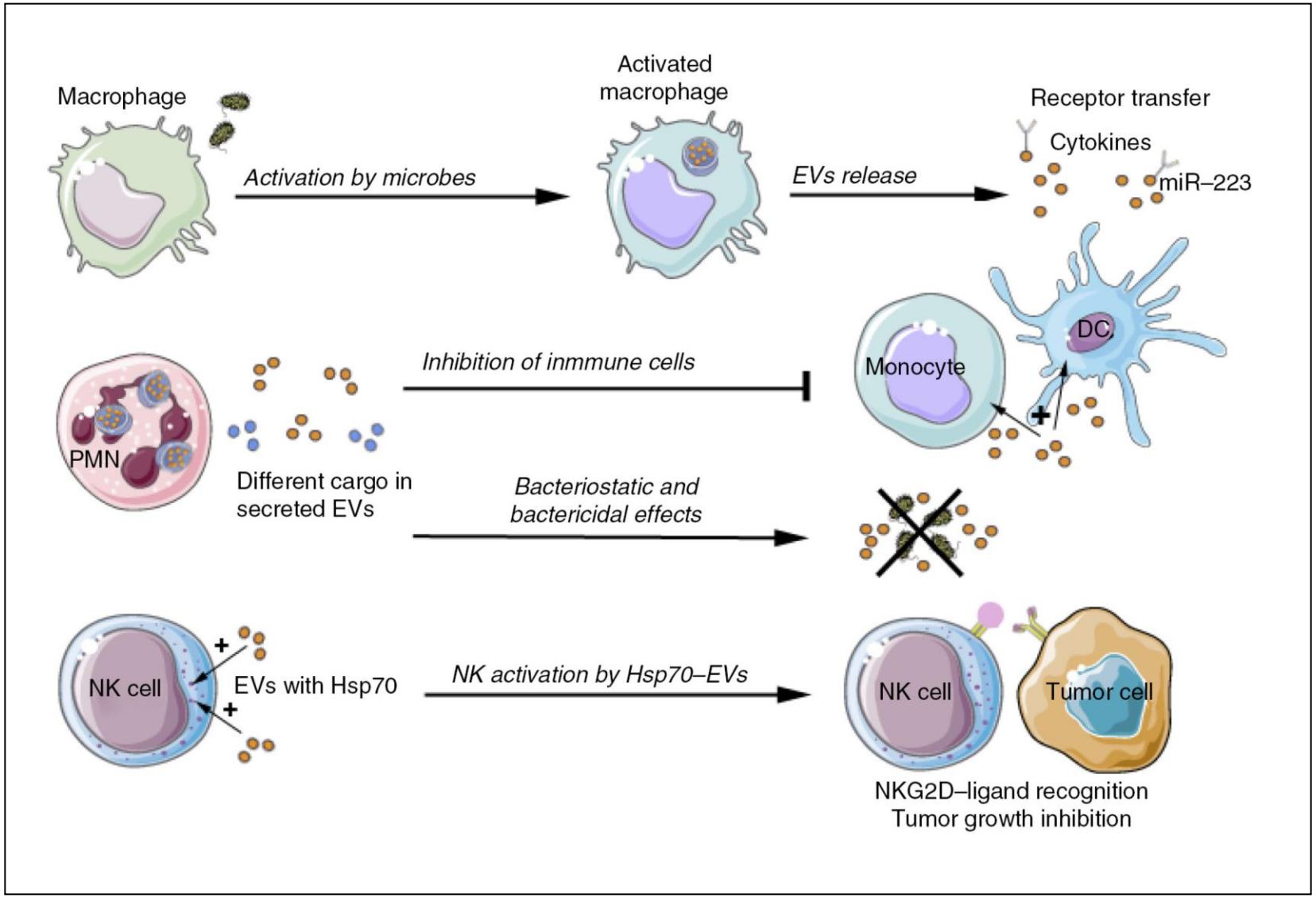
From: Camussi et al, Kidney Int 78;838 (2010)

Microvesicles and exosomes implicated in thrombosis



From: Yanez-Mo et al, J Extracell Vesicles 4;27066 (215)

Microvesicle signalling implicated in immunity



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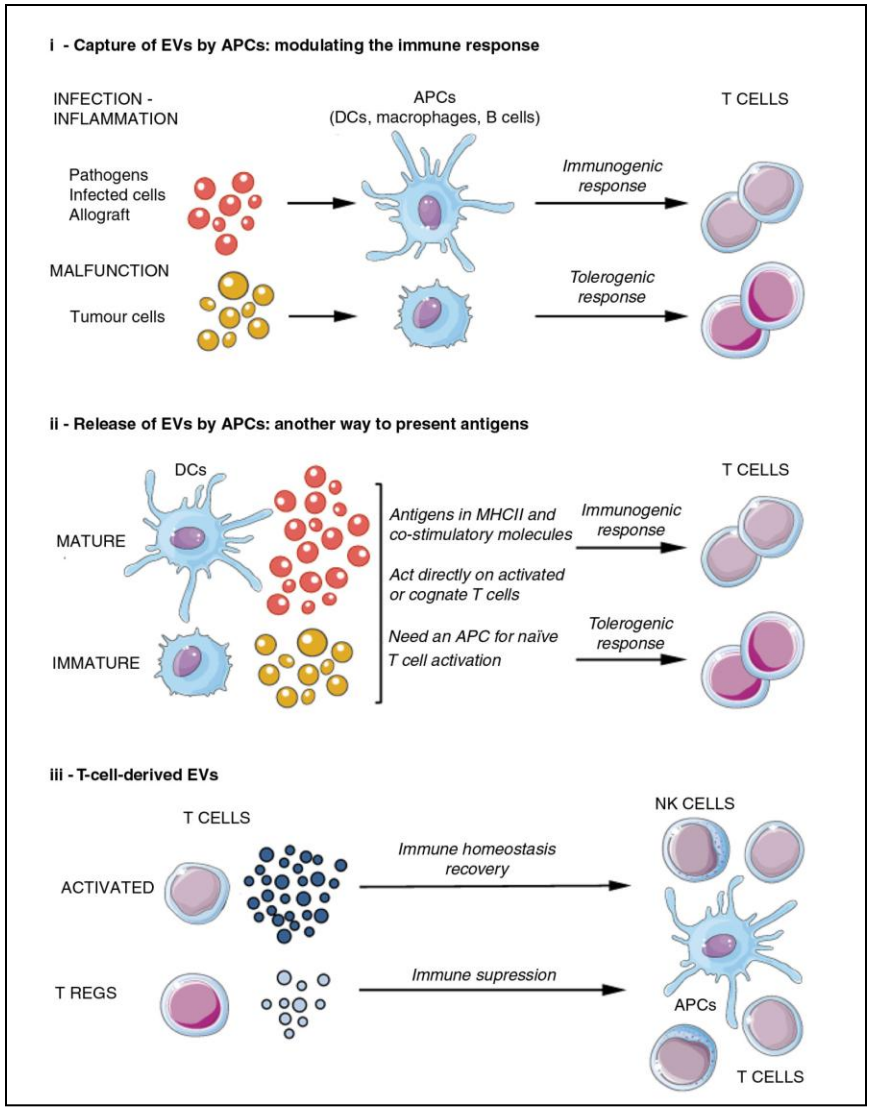
Microvesicle signalling implicated in immunity



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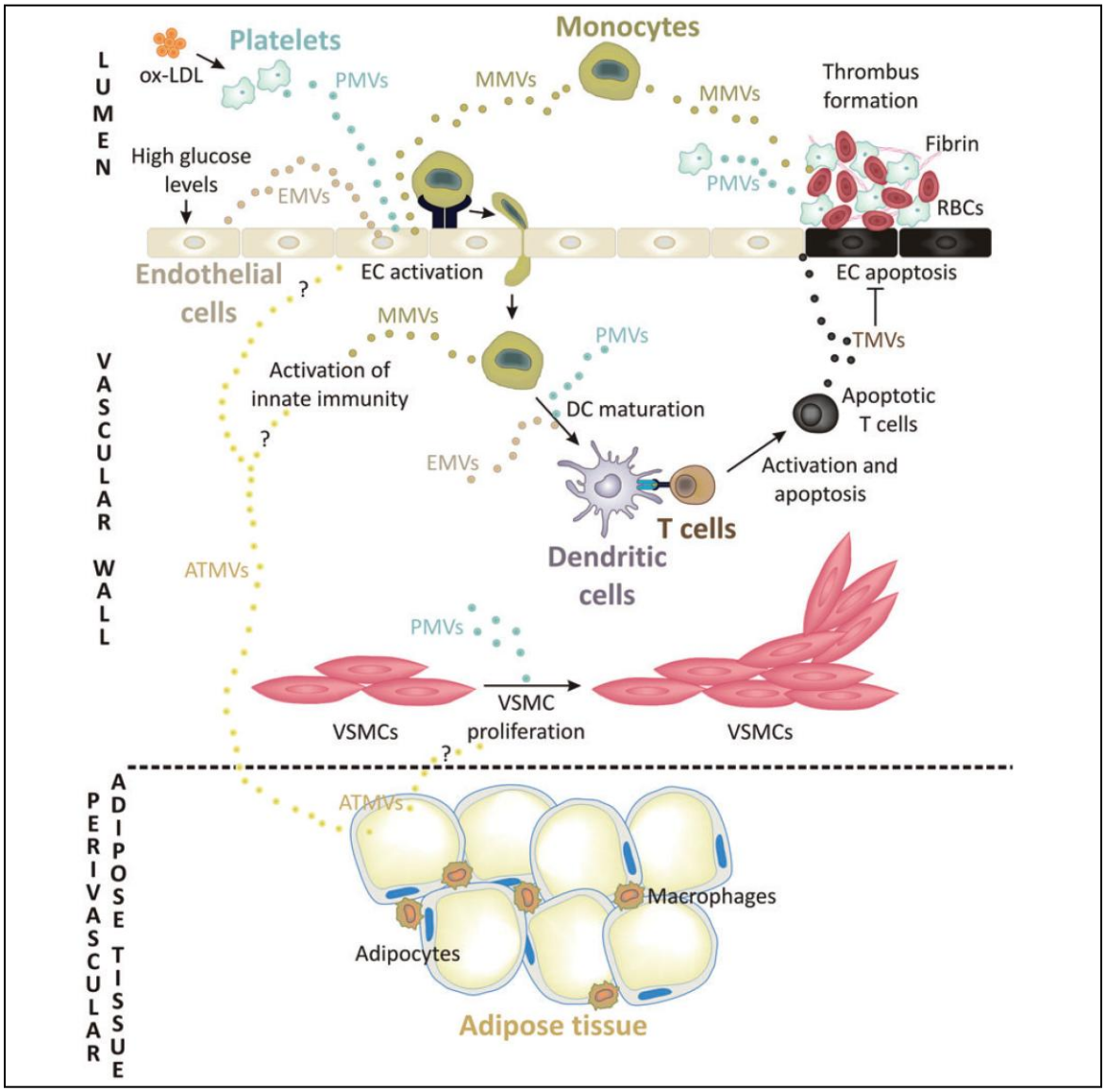
Microvesicles and exosomes implicated in atherogenesis



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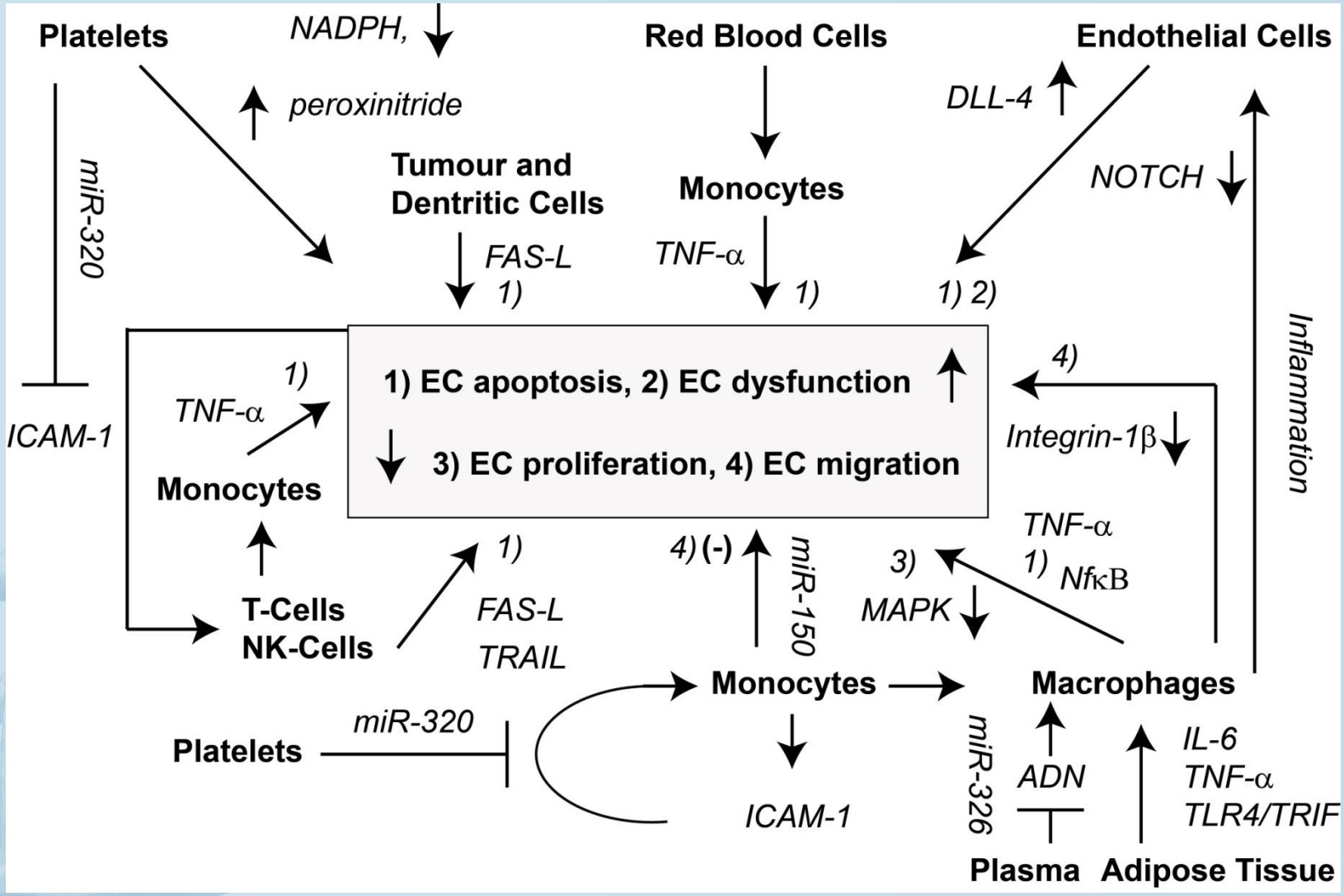
Communication – microvesicles



Microvesicles and exosomes - summary

- Detectable in circulation
- Identifiably from platelets, leukocytes, endothelium
- Contain bioactive lipids, integrins, receptors, miRNAs etc
- Circulating pattern altered and levels often increased in disease
- Potentially useful as biomarkers (particularly miRNAs, where changes in over 50 species have been reported)
- Potential paracrine actions on target cells may be protective or detrimental
- Control of assembly, selectivity of content, and release very poorly understood