Table S1

Part 1: Fast/blood cell (expressing WASP)

Paper Year (PMID)	Cell type(s)	Finding
Jones 2002 (11950596)	Macrophages (from blood of human WAS patients)	Migrating macrophages that lack WASP fail to form actin-rich protrusions. WASP-deficient cells moved aberrantly and did not have directionality toward a chemotractant. See Figure 2.
Burns 2001 (11493463)	Dendritic cells (from blood of human WAS patients)	Expressing WASP restores actin- and WASP-filled protrusions. Arp2/3 is also shown to be enriched in the protrusions. “Persistent broad, leading-edge lamellipodia do not form” and translocation is “severely compromised” in WASP-deficient cells. See Figure 5.
Badolato 1998 (9670984)	Monocytes (from human WAS patients)	Cells from WAS patients remained rounded upon stimulation with chemotractant and their migration was severely impaired; normal monocytes in their assay showed a polarized actin distribution and readily formed pseudopods
Binks 1998 (9808195)	Dendritic cells (from human WAS patients)	Cells from WAS patients were “unable to polarize normally and have severely reduced translocational motility in vitro.” (Although they did still see “ruffles” in the WASP-deficient cells, they did not observe larger lamellar structures.)
Zicha 1998 (9674738)	Machrophages and neutrophils (from human WAS patients)	Macrophages from WAS patients had defects in directional chemotaxis, although neutrophils from the same patients were not disrupted. Both mutant and wildtype cells moved at approximately the same speed. Notably, the statistical analysis in this paper eliminated any cell that did not reach a certain distance (60 um for neutrophils and 10 um for macrophages), and therefore ignored cells with severely impaired motility.
Linder 1999 (10449748)	Macrophages (from human WAS patients)	Cells from WAS patients formed fewer podosomes and filopodia, which were distributed around the entire cell instead of just at the leading edge.
Snapper 2005 (15774550)	Neutrophils (WASP-KO mouse)	Defect in chemotaxis in WASP-deficient cells (by 25-50%)
Kumar 2012 (22932798)	Neutrophils (WASP-KO mouse)	Cdc42 controls neutrophil chemotaxis and polarity via WASP. “$WASP^{-/-}$ neutrophils have defective chemotaxis and exhibit loss of polarity.” Cells lacking WASP exhibit significantly lower speed (“Sp”) and straightness (“St.”). The authors also report that WASP-deficient cells exhibit a huge increase in the *number* of protrusions, with many smaller protrusions occurring on the sides of cells instead of at the front.
Anderson 2003 (12529859)	Neutrophils (blood from healthy humans)	Neutrophils were loaded with purified SCAR or WASP peptides. High concentrations of SCAR severely disrupted motility, and WASP had a smaller effect.
Zhang 2006 (16901726)	Neutrophils (WASP-KO mouse)	WASP-deficient cells had impaired adhesion and remain unpolarized, rounded, and without protrusions. Their transendothelial migration was also severely disrupted.
Jones 2013 (23868979)	Neutrophils (Zebrafish)	Inside zebrafish embryos, reduced protrusions and cell velocity in cells with UAS-WASP mutant. See Figure 1G.

Shi 2009 (19234535)	Neutrophils (WASP-KO mouse)	WASP localizes to pseudopods of chemotacting cells. See Figure 1C.
Dovas 2009 (19808890)	Macrophages mouse and human)	Phosphoylation/dephosphoylation of WASP was required for normal podosome formation and turnover and fibronectin matrix degradation. Chemotaxis was impaired by RNAi-reduction of WASP and was rescued by adding WASP, but not by a phosphorylation mutant.
Ishihara 2013 (22279563)	Macrophages (WASP-KO mouse)	WASP is responsible for an initial wave of actin polymerization in response to global stimulation with chemotractant. Protrusions from WASP-deficient cells were directional, showing intact directional sensing. However, the protrusions from WASP-deficient cells demonstrated reduced persistence compared to wildtype cells.
Myers 2005 (15728724)	Dictyostelium	Cells will reduced levels of WASP exhibit defects in polarized actin assembly, cell migration, and chemotaxis
Veltman 2012 (22891261)	Dictyostelium	When SCAR/WAVE is knocked out, WASP assumes the localization and presumably some of the functions of SCAR/WAVE
Jain 2015 (26463123)	Jurkat T-cells (human)	Knocking down WASP in Jurkat T-cells slowed motility and abolished directionality. Overexpression of N-WASP in WASP-KD cells restored the migration velocity without correcting the chemotactic defect. However, insertion of a section of the WASP amino acid sequence into N-WASP enabled N-WASP to rescue the chemotactic defect of WASP-KD cells.
Worth 2012 (23160469)	Dendritic (WASP-KO mouse)	Cells lacking WASP form multiple unpolarized lamellipodia and exhibit migration defects (in persistence and directionality, although not speed). Expressing exogenous WASP rescues normal protrusions and migration.
Blundell 2008 (18388921)	Dendritic (WASP-KO mouse)	Number of podosome protrusions as reduced in WASP-KD cells and could be rescued by transducing with WASP. Speed of WASP-KD cells was drastically reduced compared to wildtype and WASP-rescue cells.
Zhu 2016 (27780040)	Neuroblasts (C. Elegans)	Migrating neuroblasts in developing worms use both WASP and SCAR/WAVE. SCAR mutations reduced migration and WASP mutation further impaired motility in SCAR-deficient cells.

Part 2: Cells with adhesion-based motility (expressing N-WASP)

Paper (PMID)	**Cell type(s)**	**Finding**
Misra 2007 (17963692)	Adherent fibroblasts (mouse N-WASP$^{del/del}$ cell line)	N-WASP deletion disrupts adhesion
Bryce 2005 (16051170)	Adherent fibrosarcoma cells (human)	N-WASP knockdown by siRNA did not reduce lamellapodia formation. By removing an N-WASP activator from cells the lamellipodia were not as persistent, cell migration was defective, and fewer adhesions formed
DesMarais 2009 (19373774)	Carcinoma cells (rat)	Cells depleted of N-WASP using siRNA show a defect in invadopodium-based chemotaxis
Sarmiento 2008 (18362183)	Carcinoma cells (rat)	siRNA WAVE depletion inhibited lamellipodia formation to a greater degree than N-WASP. Depleting both resulted in aberrant jagged protrusion
Bensenor 2007 (17264147)	Slowly crawling MDBK (bovine)	N-WASP, Arp2/3, and actin all localize to protrusions. N-WASP is required for FGF2-stimulated migration

Lommel 2001 (11559594)	Adherent fibroblasts (mouse N-WASP$^{flox/flox}$)	Adherent cells lacking N-WASP still form filopodia
Tang 2013 (23273897)	Carcinoma cells (human A431 and Hela cell lines)	"N-WASP has a crucial proinvasive role in driving Arp2/3 complex-mediated actin assembly in cooperation with FAK at invasive cell edges, but WRC depletion can promote 3D cell motility."
Snapper 2001 (11584271)	Fibroblasts (MEFs isolated from N-WASP$^{+/+}$ and N-WASP$^{neo/neo}$)	N-WASP is dispensable for lamellapodia and filopodia formation in fibroblasts
Mizutani 2002 (11830518)	Fibroblasts (rat)	N-WASP is essential for podosome adhesion structures and degrading extracellular matrix.