

6. LITERATUR

Abrams RA, Glaubinger D, Appelbaum FR, Deisseroth AB:

Result of attempted hematopoietic reconstitution using isologous peripheral blood mononuclear cells: A case report.
Blood 56: 516 (1980)

Anderson KC, Weinstein HJ:

Transfusion-associated graft-versus-host disease.
N Engl J Med 323: 315-321 (1990)

Andrews RG, Singer JW, Bernstein ID:

Monoclonal antibody 12-8 recognizes a 115-kd molecule present on both unipotent and multipotent hematopoietic colony-forming cells and their precursors.
Blood 67: 842-845 (1986)

Andrews RG, Singer JW, Bernstein ID:

Precursors of colony forming cells in humans can be distinguished from colony forming cells by expression of the CD33 and CD34 antigens and light scatter properties.
J Exp Med 169: 1721-1731 (1989)

Bacigalupo A, Podesta M, Raffo MR, Piaggio G, Van Lint MT, Vimercati R, Spriano VM, Risso M, Marmont AM:

Lack of in vitro colony formation in patients with severe aplastic anemia after autologous hematologic reconstitution.
Exp Hematol 8: 795-801 (1980)

Bacigalupo A, Hows J, Gluckman E, Nissen C, Marsh J, Van Lint MT, Congiu M, De Planque MM, Ernst P, McCann S, Raghavachar A, Frickhofen N, Wursch A, Marmont AM, Gordon-Smith EC:

Bone marrow transplantation (BMT) versus immunosuppression for treatment of severe aplastic anemia (SAA): a report of EBMT SAA Working Party
Br J Haematol 70: 177-182 (1988)

Bacigalupo A, Piaggio G, Figari O, Tong J, Sogno G, Tedone E, Sette A, Caciagli P, Badolati S, Marmont AM:

Response of CFU-GM to increasing doses of rhGM-CSF in patients with aplastic anemia.
Exp Hematol 19: 829 (1991)

Bacigalupo A, Piaggio G, Podesta M, Van Lint MT, Valbonesi M, Lercari G, Mori PG, Pasino M, Franchini E, Rivabella L, Figari O, Sogno G, Raffo MR, Marmont AM:

Collection of peripheral blood hemopoietic progenitors (PBHP) from patients with severe aplastic anemia (SAA) after prolonged administration of granulocyte colony-stimulating factor.

Blood 74: 1410 -1414 (1993)

Bacigalupo A, Broccia G, Corda G, Arcese W, Carotenuto M, Gallamini A, Locatelli F, Mori PG, Saracco P, Todeschini G, Coser P, Iacopino P, Van Lint MT, Gluckman E:

Antilymphocyte globulin, cyclosporin, and granulocyte colony-stimulating factor in patients with acquired severe aplastic anemia (SAA): a pilot study of the EBMT SAA Working Party.

Blood 85: 1348-1353 (1995)

Bacigalupo A, Brand R, Oneto R, Bruno B, Socie G, Passweg J, Locasciulli A, Van Lint MT, Tichelli A, McCann S, Marsh J, Ljungman P, Hovs J, Marin P, Schrezenmeier H:

Treatment of acquired severe aplastic anemia: Bone marrow transplantation compared with immunosuppressive therapy. The European Group for Blood and Marrow Transplantation experience.

Semin Haematol 37: 69-80 (2000)

Bagnara GP, Strippoli P, Bonsi L, Brizzi MF, Avanzi GC, Timeus F, Ramenghi U, Piaggio G, Tong J, Podesta M, Paolucci G, Pegoraro L, Gabutti V, Bacigalupo A:

Effect of stem cell factor on colony growth from acquired and constitutional (Fanconi) aplastic anemia.

Blood 80: 382-387 (1992)

Ball SE, Gibson FM, Rizzo S, Tooze JA, Marsh JCW, Gordon-Smith EC:

Progressive telomere shortening in aplastic anemia.

Blood 91: 3582-3592 (1988)

Baum CM, Weissmann IL, Tsukamoto AS, Buckle AM, Peault B:

Isolation of a candidate human hematopoietic stem-cell population.

Proc Nat Acad Sci USA 89: 2804-2808 (1992)

Bell AJ, Hamblin TJ, Oscier DG:

Peripheral blood stem cell autografting.

Hematol Oncol 5: 45-55 (1987)

- Bender JG, Unverzagt KL, Walker DE, Lee W, Van Epps DE, Smith DH, Steward CC, To LB:**
Identification and comparison of CD34-positive cells and their subpopulations from normal peripheral blood and bone marrow using multicolor flow cytometry.
Blood 77: 2591-2596 (1991)
- Brodsky RA, Sensenbrenner LL, Jones RJ:**
Complete remission in severe aplastic anemia after high-dose cyclophosphamide without bone marrow transplantation.
Blood 87: 491-494 (1996)
- Bruhl P, Mergenthaler HG, Dormer P:** Haemopoietic inductive capacity of irradiated stromal cell layers in human micro long-term bone marrow cultures.
Cell Tissue Kinet 21: 411-417 (1988)
- Camitta B, O'Reilly RJ, Sensenbrenner L, Rappeport J, Champlin R, Doney K, August C, Hoffmann RG, Kirkpatrick D, Stuart R, Santos G, Parkman R, Gale RP, Storb R, Nathan D:**
Antithoracic duct lymphocyte globulin therapy of severe aplastic anemia.
Blood 62: 883-888 (1983)
- Champlin RE, Gale RP:**
Treatment of aplastic anemia with antithymocyte globulin (abstract).
Blood 54 (Suppl.): 58 (1979)
- Champlin RE, Nimer SD, Ireland P, Oette DH, Golde DW:**
Treatment of refractory aplastic anemia with recombinant human granulocyte-macrophage-colony-stimulating factor.
Blood 73: 694-699 (1989)
- Craddock CF, Apperley JF, Wright EG, Healy LE, Bennett CA, Evans M, Grimsley PG, Gorgon MY:**
Circulating stem cells in mice treated with cyclophosphamide.
Blood 80: 264-269 (1992)
- Craig W, Kay R, Curler RI, Lansdorp PM:**
Expression of Thy-1 on human hematopoietic progenitor cells.
J Exp Med 177: 1331-1342 (1993)
- Demuyneck H, Pettengell R, de Campos E, Dexter TM, Testa NG:**
The capacity of peripheral blood stem cells mobilised with chemotherapy plus G-CSF to repopulate irradiated marrow stroma in vitro is similar to that of bone marrow.
Eur J Cancer 28: 381-386 (1992)

Dooley DC, Law P:

Detection and quantitation of long-term culture-initiating cells in normal human peripheral blood.

Exp Hematol 20: 156-160 (1992)

Eaves CJ, Sutherland HJ, Cashman JD, Otsuka T, Lansdorp PM, Humphries RK, Eaves AC, Hogge DE:

Regulation of primitive human hematopoietic cells in long-term marrow culture.

Semin Haematol 28: 126-131 (1991)

Elias AD, Ayash L, Anderson KC, Hunt M, Wheeler C, Schwartz G, Tepler I, Mazanet R, Lynch C, Pap S, Pelaez J, Reich E, Critchlow J, Demetr G, Bibbo J, Schnipper L, Griffin JD, Frei III E, Antman KH:

Mobilisation of peripheral blood progenitor cells by chemotherapy and granulocyte-macrophage colony-stimulating factor for hematologic support after high-dose intensification for breast cancer.

Blood 79: 3036-3044 (1992)

Faille A, Barrett AJ, Balitrand N, Ketels F, Gluckman E, Najean Y:

Effect of antilymphocyte globulin on granulocyte precursors in aplastic anemia.

Br J Haematol 42: 371-380 (1979)

Fraser CC, Szilvassy SJ, Eaves CJ, Humphries RK:

Proliferation of totipotent hematopoietic stem cells in vitro with retention of long-term competitive in vivo reconstituting ability.

Proc Natl Acad Sci USA 89: 1968-1972 (1992)

Frickhofen N, Kaltwasser JP, Schrezenmeier H, Raghavachar A, Vogt HG, Herrmann F, Freund M, Meusers P, Salama A, Heimpel H:

Treatment of aplastic anemia with antilymphocyte globulin and methylprednisolone with or without cyclosporine. The German Aplastic Anemia Study Group.

New Engl J Med 324: 1297-1304 (1991)

Frickhofen N, Schrezenmeier H, Bacigalupo A:

Results of European Trials of immunosuppression for treatment of aplastic anemia. In: Gluckman E, Coulombel L (eds): Ontogeny of hematopoiesis - Aplastic Anemia, Montrouge, London, Editions John Libbey Eurotext, S. 335-343 (1995)

Gale RP, Champlin RE, Feig SA, Fitchen JH:

Aplastic anemia: biology and treatment.

Ann Intern Med 95: 477-494 (1981)

Ganser A, Lindemann A, Ottmann OG, Seipelt G, Hess U, Geissler G, Kanz L, Frish J, Schulz G, Hermann F, Mertelsmann R, Hoelzer D:

Sequential in vivo treatment with two recombinant human hemopoietic growth factors (interleukin 3 and granulocyte macrophage colony stimulating factor) as a new therapeutic modality to stimulate hematopoiesis: Result of a phase I study.

Blood 79: 2583-2591 (1992)

Genestier L, Fournel S, Flacher M, Assossou O, Revillard JP, Bonnefoy-Berard N:

Induction of Fas (Apo-1, CD95)-mediated apoptosis of activated lymphocytes by polyclonal antithymocyte globulins.

Blood 91: 2360 - 2368 (1998)

Gianni AM, Siena S, Bregni M, Tarella C, Stern AC, Pileri A, Bonadonna G:

Granulocyte-macrophage colony-stimulating factor to harvest circulating haemopoietic stem cells for auto-transplantation.

Lancet 2: 580-585 (1989)

Gordon MY:

Stem cells and the microenvironment in aplastic anemia.

Br J Haematol 84: 190-192 (1994)

Gordon Smith EC:

Aplastic anemia-aetiology and clinical features.

Baillieres Clin Haematol 2: 1-18 (1989)

Gordon Smith EC, Yandle A, Milne A, Speck B, Marmont AM, Willemze R, Kolb HJ:

Randomized placebo controlled study of rhGM-CSF following ALG in the treatment of aplastic anemia.

Bone Marrow Transplant 2 (suppl 2): 78-80 (1991)

Huang AT, Mold NG:

The role of CD45RO in antithymocyte globulin's stimulation of primitive haemopoietic cells.

Br J Haematol 88: 643-646 (1994)

International Agranulocytosis and Aplastic Anemia Study Group:

Incidence of aplastic anemia: the relevance of diagnostic criteria.

Blood 70: 1718-1721 (1987)

Jenal, M:

Defekt hämatopoetischer Stammzellen bei aplastischer Anämie.

Dissertationsschrift, Universität Ulm (1995)

Juttner CA, To LB, Haylock DN, Dyson PG, Thorrp D, Dasrt GW, Ho JQK, Horvarth N, Bardy P:

Autologous stem cell transplantation.
Transplant Proc 21: 2929-2931 (1989)

Kern P, Heimpel H, Heit W, Kubanek W:

Granulocytic progenitor cells in aplastic anemia.
Br J Haematol 65: 613-623 (1977)

Killik SB, Marsh JCW, Gordon-Smith EC, Sorlin L, Gibson FM:

Effects of antithymocyte globulin on bone marrow CD34⁺ cells in aplastic anemia and myelodysplasia.
Br J Haematol 108: 582-591 (2000)

Kojima S, Matsuyama T:

Stimulation of granulopoiesis by high dose recombinant human granulocyte colony stimulating factor in children with aplastic anemia and very severe neutropenia.
Blood 83: 1474-1478 (1994)

Krause DS, Fackler MJ, Civin CI, May WS:

CD34: structure, biology and clinical utility.
Blood 87: 1-13 (1996)

Kurtzberg J, Laughlin M, Graham ML, Smith C, Olson JF, Halperin EC, Ciocci G, Carrier C, Stevens CE, Rubinstein P:

Placental blood as a source of hematopoietic stem cells for transplantation into unrelated recipients.
N Engl J Med 335: 157-166 (1996)

Maciejewski JP, Anderson S, Katevas P, Young NS:

Phenotypic and functional analysis of bone marrow progenitor cell compartment in bone marrow failure.
Br J Haematol 87: 227 - 231 (1994)

Maciejewski JP, Selleri C, Sato T, Anderson CS, Young NS:

Increased expression of Fas antigen on bone marrow CD34⁺ cells of patients with aplastic anemia.
Br J Haematol 91: 245-252 (1995a)

Maciejewski JP, Selleri C, Anderson CS, Young NS:

Fas antigen expression on CD34⁺ human marrow cells is induced by interferon gamma and tumor necrosis factor alpha and potentiates cytokine-mediated hematopoietic suppression *in vitro*.
Blood 85: 3183-3190 (1995b)

Maciejewski JP, Selleri C, Sato T, Anderson CS, Young NS:

A severe and consistent deficit in marrow and circulating primitive hematopoietic cells (long-term culture initiating cells) in acquired aplastic anemia.

Blood 88: 1983-1991 (1996)

Maciejewski JP, Kim S, Sloand E, Selleri C, Young NS:

Sustained long-term hematologic recovery despite a marked quantitative defect in the stem cell compartment of patients with aplastic anemia after immunosuppressive therapy.

Am J Hematol 65: 123-131 (2000)

Marmont AM:

The graft versus leukemia effect (GVL) after bone marrow transplantation for chronic myelogenous leukemia.

Leuk Lymphoma 11 (suppl 1): 221-226 (1993)

Margolis D, Camitta B, Pietryga D, Keever-Taylor C, Baxter-Lowe LA, Pierce K, Kupst MJ, French J 3rd, Truitt R, Lawton C, Murray K, Garbrecht F, Flomenberg N, Casper J:

Unrelated donor bone marrow transplantation to treat severe aplastic anaemia in children and young adults.

Br J Haematol 94: 65-72 (1996)

Marsh JCW, Chang J, Testa NG, Hows JM, Dexter TM:

The hematopoietic defect in aplastic anemia assessed by long-term marrow culture.

Blood 76: 1748-1757 (1990)

Marsh JCW, Chang J, Testa NG, Hows JM, Dexter TM:

In vitro assessment of marrow stem cell and stromal cell function in aplastic anemia.

Br J Haematol 78: 258-267 (1991)

Marsh JCW, Gordon Smith EC:

Treatment of aplastic anemia with antilymphocyte globulin and cyclosporin.

Int J Haematol 62: 133-144 (1995)

Matsuo Y, Iwanaga M, Mori H, Yoshida S, Kawaguchi Y, Yakata Y, Murata K, Nagai K, Jinnai I, Matsuo T, Kuriyama K, Tomonaga M:

Recovery of hematopoietic progenitor cells in patients with severe aplastic anemia who obtained good clinical response with a combination therapy of immunosuppressive agents and recombinant human granulocyte colony-stimulating factor.

Int J Haematol 72: 37-43 (2000)

Micklem HS, Anderson N, Ross E:

Limited potential of circulating haemopoietic stem cells CBA mica.
Nature 256: 41-43 (1975)

Moore MA:

Stem cell proliferation: ex vivo and in vivo observations.
Stem cells 15: 239-244 (1997)

Moulinex G, Pojda Z, Hampson I, Lord BI, Dexter TM:

Transplantation potential of peripheral blood stem cells induced by colony-stimulating factor.
Blood 76: 2153-2158 (1990)

Nissen C:

Pathophysiology of aplastic anemia.
Baillieres Clin Haematol 2: 237-240 (1989)

Notaro R, Cimmino A, Tabarini D, Rotoli B, Luzzatto L:

In vivo telomere dynamics of human hematopoietic stem cells.
Proc Natl Acad Sci USA 94: 13782-13785 (1997)

Novitzky N, Jacobs P:

Immunosuppressive therapy in bone marrow aplasia: the stroma functions normally to support hematopoiesis.
Exp Hematol 23: 1472-1477 (1995)

Passweg JR, Schrezenmeier H, Camitta B, Socie G, Hows J, Rowlings PA, Horowitz MM:

Alternative donor bone marrow transplantation for patients with severe aplastic anemia.
Exp Hematol 25: 779 (abstract) (1997)

Pettengell R, Luft T, Henschler R, Hows JM, Dexter TM, Ryder D, Testa NG:

Direct comparison by limiting dilution analysis of long-term culture-initiating cells in human bone marrow, umbilical cord blood and blood stem cells.
Blood 84: 3653-3659 (1994)

Philpott NJ, Scopes J, Marsh JC, Gordon-Smith EC, Gibson FM:

Increased apoptosis in aplastic anemia bone marrow progenitor cell. Possible pathophysiologic significance.
Exp Hematol 23: 1642-1648 (1995)

Podesta M, Piaggio G, Frassoni F, Pitto A, Ziskos P, Sessarego M, Abata M, Van Lint MT, Berriso G, Bacigalupo A:

The assessment of the hematopoietic reservoir after immunosuppressive therapy or bone marrow transplantation in severe aplastic anemia.
Blood 91: 1959-1965 (1998)

Raghavachar A, Kolbe K, Höffken K, Seipelt G, Burk M, Ganser A, Pasold R, Zwingers T, Schrezenmeier H:

Standard immunosuppression is superior to cyclosporine / fligrastrim in severe aplastic anemia: The German multicenter study.
Abstract. Blood 90 (suppl 1): 439 (1997)

Richman CM, Weiner RS, Yankee RA:

Increase in circulating stem cells following chemotherapy in man.
Blood 47: 1031-1039 (1976)

Rosenfeld SJ, Kimball J, Vining D, Young NS:

Intensive immunosuppression with antithymocyte globulin and cyclosporine as treatment for severe acquired aplastic anemia.
Blood 85: 3058 - 3065 (1995)

Schrezenmeier H, Jenal M, Herrmann F, Heimpel H, Raghavachar A:

Quantitative analysis of cobblestone area-forming cells in bone marrow of patients with aplastic anemia by limiting dilution assay.
Blood 88: 4474 - 4480 (1996)

Scopes J, Bagnara M, Gordon-Smith EC, Ball SE, Gibson FM:

Haemopoietic progenitor cells are reduced in aplastic anemia.
Br J Haematol 86: 427 - 430 (1994)

Siena S, Bregni M, Brando B, Belli N, Ravagnani L, Bonadonna G, Gianni AM:

Circulation of CD34⁺ hematopoietic stem cells in the peripheral blood of high-dose cyclophosphamide-treated patients: Enhancement by intravenous recombinant human granulocyte-macrophage colony-stimulating factor.
Blood 74: 1905-1914 (1989)

Siena S, Bregni M, Brando B, Belli N, Ravagnani L, Gandola A, Ster AC, Lansdorp PM, Bonadonna G, Gianni AM:

Flow cytometry for clinical estimation of circulating hematopoietic progenitors for autologous transplantation in cancer patients.
Blood 77: 400-409 (1991)

Socie G, Henry-Amar M, Bacigalupo A, Hows J, Tichelli A, Ljungman P, McCann SR, Frickhofen N, Van't Veer-Korthof E, Gluckman E:

Malignant tumors occurring after treatment of aplastic anemia. European Bone Marrow Transplantation-Severe Aplastic Anaemia Working Party.
N Engl J Med 329: 1152-1157 (1993)

- Sonoda Y, Yashige H, Fujii H, Tsuda S, Naekawa T, Misawa S, Abe T:**
Bilineage response in refractory aplastic anemia patients following long term administration of recombinant human granulocyte colony stimulating factor.
Eur J Haematol 48: 41-48 (1992)
- Storb R, Etzioni R, Anasetti C, Appelbaum FR, Buckner CD, Bensinger W, Bryant E, Clift R, Deeg HJ, Doney K, Flowers M, Hansen J, Martin P, Pepe M, Sale G, Sanders J, Singer J, Sullivan KM, Thomas ED, Witherspoon RP:** Cyclophosphamide combined with antithymocyte globulin in preparation for allogenic marrow transplants in patients with aplastic anemia.
Blood 84: 941-949 (1994)
- Sutherland HJ, Eaves CJ, Eaves AC, Dragowska W, Lansdorp PM:**
Characterization and partial purification of human marrow cells capable of long-term hematopoiesis in vitro.
Blood 74: 1563-1574 (1989)
- Sutherland HJ, Lansdorp PM, Henkelman DH, Eaves AC, Eaves CJ:**
Functional characterization of individual human hematopoietic stem cells cultured at limiting dilution on supportive marrow stromal layers.
Proc Natl Acad Sci USA 87: 3584-3588 (1990)
- Taswell C:**
Limiting dilution assays for the determination of immunocompetent cell frequencies.
J Immunol 126: 1614-1619 (1981)
- Tisdale JF, Dunn DE, Geller N, Plante M, Nunez O, Dunbar CE, Barrett AJ, Walsh TJ, Rosenfeld SJ, Young NS:**
High-dose cyclophosphamide in severe aplastic anemia: a randomised trial.
Lancet 356: 1554-1559 (2000)
- Tong J, Bacigalupo A, Piaggio G, Figari O, Sogno G, Marmont A:**
In vitro response of T cells from aplastic anemia patients to antilymphocyte globulin and phytohemagglutinin: colony-stimulating activity and lymphokine production.
Hematology 19: 312-316 (1991)
- Torok Storb B, Doney K, Brown SL, Prentice RL:**
Correlation of two in vitro tests with clinical response to immunosuppressive therapy in 54 patients with severe aplastic anemia.
Blood 63: 349-355 (1984)

Udomsadki C, Lansdorp PM, Hogge DE, Reid DS, Eaves AC, EavesCJ:

Characterization of primitive hematopoietic cells in normal human peripheral blood.

Blood 80: 2513-2521 (1992)

Young NS, Barrett AJ:

The treatment of severe acquired aplastic anemia.

Blood 85: 3367-3377 (1995)

Young NS, Maciejewski JP:

The pathophysiology of acquired aplastic anemia.

N Engl J Med 336: 1365-1372 (1997)

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