Publications – Dendritic Cells – Prof. Dr. J.H. Peters

1. **First description of cell membrane transporters for nucleosides and sugar in lymphocytes and their rapid activation by mitogen-minute bond: earliest events of immune activation**

Peters, J.H., P. Hausen: Effect of phytohemagglutinin on lymphocyte membrane transport. 1. Stimulation of uridine uptake. Eur. J. Biochem. 19 (1971) 502-508

Peters, J.H., P. Hausen: Effect of phytohemagglutinin on lymphocyte membrane transport. 2. Stimulation of "facilitated diffusion" of 3-0-methyl-glucose. Eur. J. Biochem. 19 (1971) 509-513

2. **Initial measurements of cell contact-dependence of lymphocyte stimulation Hypothesis of cell contact-dependence of lymphocyte stimulation**

Peters, J.H.: Contact cooperation in stimulated lymphocytes.
I. Influence of cell contact on unspecifically stimulated lymphocytes. Exptl. Cell Res. 74 (1972) 179-186

Huelser, D.F., J.H. Peters: Contact cooperation in stimulated lymphocytes.

II. Electrophysiological investigations on intercellular communication. Exptl. Cell Res. 74 (1972) 319-326

Peters, J.H.: Membrane functions connected with the mitogenic activation of lymphocytes. In: Erythrocytes, Thrombocytes, Leukocytes. Recent Advances in Membrane and Metabolic Research. G. Thieme, Stuttgart (1973) pp 428-432

3. **Heterogeneity of the cooperating cells**

Peters, J.H.: On the hypothesis of cell contact mediated lymphocyte stimulation. In: K. Lindahl-Kiessling and D. Osoba (eds.), Lymphocyte recognition and effector mechanisms. Academic Press (1974) pp 13-17

4. **Two signal theory of lymphocyte stimulation. - While other groups studied on a single signal for lymphocyte stimulation (Approx influx, cyclic AMP), the group of Prof. Peters showed, that a signal-synergism is to presuppose this.**

Peters, J.H., L. Schimmelpfeng: Cooperative pathway induction of T lymphocyte mitogen stimulation. Z. Immun. Forsch. 155 (1978) 169-182

5. **New method of production of dendritic cells from the spleen**

The macrophages were elicited by a migration from the spleen and Phagozytosesignal For this technique, were left dendritic cells.

Peters, J.H. Adherent cell heterogeneity (I): Non phagocytic adherent cells in mouse spleen. Immunobiology 157 (1980) 261 (Abstr.)

6. **First hybridomas by dendritic cells**

Peters, J.H.:Hybridomas of mouse dendritic cells (DC) expressing phenotypic markers of DC including growth-stimulatory action on T-lymphocytes. In: K. Resch and H. Kirchner (eds.), Mechanisms of lymphocyte activation. Elsevier/North Holland, Amsterdam (1981) 537-540

7. **1982: Decision to change research on dendritic cells from mouse to man.**
   1987: First experimental evidence that dendritic cells can be derived from monocytes.

Peters JH, Ruhl S & Friedrichs D: Veiled accessory cells deduced from monocytes. Immunobiol 176 (1987) 154-66

8. **The term "dendritic cell" is explicitly included in the text. In the title he was not tolerated by the speakers. The idea was not new, because pathologists had already described morphological evidence for this career, but could not prove it.**

Najar HM, Bru-Capdeville AC, Gieseler RKH & Peters JH: Differentiation of human monocytes into accessory cells at serum-free conditions. Eur J Cell Biol 51 (1990) 339-46

9. **Cyclic adenosine monophosphate (cAMP) as an intracellular signal**

Najar HM, Ruhl S, Bru-Capdeville AC & Peters JH: Adenosine and its derivatives control human monocyte differentiation into highly accessory cells versus macrophages. J Leuk Biol 47 (1990) 429-39

Peters JH, Börner T & Ruppert J: Accessory phenotype and function of macrophages induced by cyclic adenosine monophosphate. Int Immunol 2 (1990) 1195-202

10. **Other extracellular signals that are involved in the differentiation: cytokines - IL4, IL1, IL6**

Ruppert J, Friedrichs D, Xu H & Peters JH: IL-4 decreases the expression of the monocyte differentiation marker CD14, paralleled by an increasing accessory potency. Immunobiol 182 (1991) 449-64

Ruppert J & Peters JH: Accessory cell function during monocyte/macrophage differentiation: relation to interleukin-1 (IL-1) production and release. Eur J Cell Biol. 55 (1991) 352-61

Ruppert J & Peters JH: Interleukin-6 (IL-6) and interleukin-1 (IL-1) enhance the accessory activity of human blood monocytes during differentiation to macrophages. J Immunol 146 (1991) 144-9

Xu H, Friedrichs U, Gieseler RKH, Ruppert J, Ocklind G & Peters JH: Human blood dendritic cells exhibit a distinct T-cell-stimulating mechanism and differentiation pattern. Scand J Immunol 36 (1992) 689-96

11. Origin of dendritic cells from the myeloid series in the bone marrow: a paradigm shift

The prevailing view, which was maintained until 1994, said that dendritic cells from bone marrow derived, but do not belong to the well-known lines.
A second paradigm was that of macrophages researchers that macrophages are defined by phagocytosis and non-phagocytic cells thus are not macrophages.

The assertion that dendritic cells from the myeloid line stem ("myeloid" = to the line of monocytes, macrophages and granulocytes properly), so injured both paradigms.

Although the proof of the origin of dendritic cells from monocytes strictly a "myeloid" home calls, this was not accepted. Therefore, the authors, to prove once again directly on the rat bone marrow cells chosen. So they could first prove the origin of myeloid dendritic cells directly.

Gieseler RKH, Röber R-A, Kuhn R, Weber K, Osborn M & Peters JH: Dendritic accessory cells derived from rat bone marrow precursors under chemically defined conditions in vitro belong to the myeloid lineage. Eur J Cell Biol 54 (1991) 171-81

12. 1992: International Conference on dendritic cells in Amsterdam. Full cytokine combination, Evidence under defined (serum-free) conditions

Combination of GM-CSF and IL-4 to form dendritic cells from monocytes first described. Published in the conference proceedings 1993

Peters JH, Xu H, Ruppert J, Ostermeier D, Friedrichs D & Gieseler RKH: Signals required for differentiating dendritic cells from human monocytes in vitro. Adv Exp Med Biol 329 (1993) 275-80

Ruppert J, Schütt C, Ostermeier D & Peters JH: Down-regulation and release of CD14 on human monocytes by IL-4 depends on the presence of serum or GM-CSF. Adv Exp Med Biol 329 (1993); 281-6

Xu H, Friedrichs U, Gieseler RKH, Ruppert J, Ocklind G & Peters JH: Distinct T cell stimulation mechanism and phenotype of human blood dendritic cells. Adv Exp Med Biol 329 (1993) 93-8

13. Paradigm dispute: monocyte subpopulations versus plasticity

Monocytes can not be 100% in a pure state. Therefore Dendritic cells could also arise from accompanying non-monocytic precursors that contaminate the population of monocytes. Alternatively, they could arise from small subpopulations of monocytes. This can be explained by the high yield of dendritic cells but only the additional assumption of strong proliferation. It has never been described. The same is true for monocyte subpopulations: The thesis of rigid monocyte subpopulations that are already predetermines for differentiation into macrophages, dendritic cells, osteoclasts, endothelial cells, etc., could not be proven.

Peters JH, Gieseler R, Thiele B & Steinbach F: Dendritic cells: from ontogenetic orphans to myelomonocytic descendants. Immunol Today 17 (1996) 273-8

14. Interferon-gamma

And gamma-interferon (IFN-γ) was found to be an important additional signal very early, which was not introduced until years later as a polarization factor in the discussion.

Xu H, Krämer M, Spengler H-P & Peters JH: Dendritic cells differentiated from human monocytes through a combination of IL-4, GM-CSF and IFN-□ exhibit phenotype and function of blood dendritic cells. Adv Exp Med Biol 378 (1995) 75-8

This led to the idea that there are two alternatives for the differentiation of dendritic cells (now called "polarization"), represented by the influence of Th1 and Th2 cytokines.

Gieseler R, Heise D, Soruri A, Schwartz P & Peters JH: In-vitro differentiation of mature dendritic cells from human blood monocytes. Develop Immunol 6 (1998) 25-39

15. Differentiation

The conversion of monocytes to dendritic cells is a differentiation process. Thus monocytes to "plastic", perhaps pluripotent cells. "Transdifferentiation" is the current term for this. As early as 1990 there is evidence to support this approach:

Najar HM, Ruhl S, Bru-Capdeville AC & Peters JH: Adenosine and its derivatives control human monocyte differentiation into highly accessory cells versus macrophages. J Leuk Biol 47 (1990) 429-39

16. **Just recently, the process of transdifferentiation into dendritic cells was again the mechanism of eicosanoid formation by metabolism via the 5 vs. Assigned 15-lipoxygenases. In the already quoted above work Gieseler et al. (1991), a protocol already has been proposed to distinguish dendritic cells over linoleic acid. The process over 5 vs. 15-lipoxygenases was discussed in detail.**

Gieseler RKH, Röber R-A, Kuhn R, Weber K, Osborn M & Peters JH: Dendritic accessory cells derived from rat bone marrow precursors under chemically defined conditions in vitro belong to the myeloid lineage. Eur J Cell Biol 54 (1991) 171-81

17. **When looking for the definition of "differentiation" features of the nuclear membrane were used, which are assigned to the term.**

Röber R-A, Gieseler RKH, Osborn M, Weber K & Peters JH: Induction of nuclear lamins A/C in macrophages in in vitro cultures of rat bone marrow precursor cells and human blood monocytes, and in macrophages elicited in vivo by thioglycollate stimulation. Exp Cell Res 190 (1990) 185-94

Gieseler RKH, Xu H, Schlemminger R & Peters JH: Serum-free differentiation of rat and human dendritic cells, accompanied by acquisition of the nuclear lamins A/C as differentiation markers. Adv Exp Med Biol 329 (1993) 287-91

18. **Review articles, textbooks**

The group has shown over the years their theories and findings in systematic reviews. Particularly the work in Immunology Today, which then found its way into textbooks was known.

Peters JH, Ruppert J, Gieseler RKH, Najar HM & Xu H: Differentiation of human monocytes into CD14 negative accessory cells: do dendritic cells derive from the monocytic lineage? Pathobiol 59 (1991) 122-6

Peters JH, Gieseler R, Thiele B & Steinbach F: Dendritic cells: from ontogenetic orphans to myelomonocytic descendants. Immunol Today 17 (1996) 273-8

Steinbach F, Gieseler R, Soruri A, Krause B & Peters JH: Myeloid DCs deduced from monocytes. In-vitro and in-vivo data support a monocytic origin of DCs. Adv Exp Med Biol 417 (1997) 27-32