THE INVENTION CLAIMED IS:

1. A method of predetermining a time profile of contrast agent concentration at a position in a blood vessel of a patient in the context of contrast agent-enhanced magnetic resonance (MR) imaging of a region of interest only during an initial flooding-in phase of the contrast agent into the blood vessel situated in the region of interest, the method comprising:

establishing an expected broadening of a contrast agent bolus profile B(t) according to the equation $\Delta W = W2 - W1$ wherein W1 is a first width of the contrast agent bolus profile B(t) at a predetermined first vessel position of the patient and W2 is a second width of a contrast agent concentration profile K(t) at a predetermined second vessel position situated in the region of interest of the patient (P);

such that the expected broadening is established by determining at least one flow parameter which is dependent on at least one blood flow property of the patient at a third vessel position thereof and which correlates with the expected broadening of the contrast agent bolus profile B(t).

2. The method according to claim 1 wherein at least one of the region of interest and the predetermined second vessel position therein is situated downstream of a cardiopulmonary passage of the patient in relation to flow of blood therein.

3. The method according to claim 2 wherein at least one of the region of interest and the predetermined second vessel position therein is situated in a peripheral region of the patient, in particular in a limb thereof.

4. The method according to claim 1 wherein the expected broadening ($\Delta W = W2 - W1$) is stored in an electronic memory for further use by a computer.

5. The method according to claim 1 wherein the at least one blood flow property is established without the presence of contrast agent by way of a phase contrast magnetic resonance measurement.

6. The method according to claim 1 wherein at least one of a bolus transfer time and a bolus arrival time is additionally determined between the predetermined first vessel position and the predetermined second vessel position.

7. The method according to claim 6 wherein the contrast agent concentration profile (K(t)) at the predetermined second vessel position is determined from the expected broadening ($\Delta W = W2 - W1$) and the at least one of the bolus transfer time and the bolus arrival time.

8. The method according to claim 1, the method comprising:

establishing a correlation between a broadening ($\Delta W = W2 - W1$) of at least one contrast agent bolus profile (B(t)) having a first width (W1) at a first vessel position (P1) in relation to a contrast agent concentration profile (K(t)) having a second width (W2) at a second vessel position (P2), the correlation being established using a flow parameter (P_G) dependent upon at least a blood flow property (f_B) of the patient (P) at a third vessel position (P3) thereof and taking into account at least one patient parameter (P_P) of an examined patient collective;

determining from the patient (P) at least one flow parameter (P_{Pa}) currently representative thereof;

selecting a desired contrast agent concentration profile (K(t)) to be achieved at the second vessel position (P2) and, using the correlation, determining a necessary contrast agent bolus profile (B(t)) required therefor, taking into account at least one patient parameter (P_P) of the patient (P); and

enabling the necessary contrast agent bolus profile (B(t)) to be one of selectable from or transmittable to an injection device for use in a contrast agent-enhanced MR examination.

9. The method according to claim 8 wherein the blood flow property (f_B) of the patient at the third vessel position (P3) is determined via a phase contrast magnetic resonance examination.

10. The method according to claim 9 wherein the phase contrast magnetic resonance examination for determining the blood flow property (f_B) is performed without the contrast agent being present in a blood circulation of the patient (P).

11. The method according to claim 8, wherein at least one of the following variables is used as the at least one patient parameter (P_P): sex, weight, height, age, heart rate, body mass index, type of stature, and distance between the vessel positions.

12. The method according to claim 8 wherein at least one of the following properties is used as the blood flow property (f_B):

(a) maximum, minimum or mean blood flow velocity (v_G) at at least one predetermined position in a cross section of the blood vessel at the vessel position;

(b) maximum, minimum or mean blood flow velocity (v_G) at at least one predetermined position in a cross section of the blood vessel at the vessel position at a given heart or pulse phase;

(c) maximum, minimum or mean blood flow velocity (v_G) at at least one predetermined position in a cross section of the blood vessel at the vessel position at a given heart or pulse phase over a predetermined measurement time period;

(d) maximum, minimum or mean blood flow volume at at least one predetermined position in a cross section of the blood vessel at the vessel position;

(e) maximum, minimum or mean blood flow volume at at least one predetermined position in a cross section of the blood vessel at the vessel position at a given heart or pulse phase;

(f) maximum, minimum or mean blood flow volume at at least one predetermined position in a cross section of the blood vessel at the vessel position at a given heart or pulse phase over a predetermined measurement time period;

(g) a geometric property of a velocity profile over a cross section of the blood vessel at the vessel position; and

(h) net forward volume over a predetermined period of time or per heartbeat.

13. The method according claim 8 wherein the blood flow property (f_B) itself is used as the flow parameter (P_G).

14. The method according to claim 8 wherein an absolute or percentage difference between the blood flow property (f_B) at the third vessel position (P3) in relation to the blood flow property (f_B) of a same type at a fourth vessel position (P4) is used as the flow parameter (P_G).

15. The method according to claim 8 wherein the first vessel position (P1) satisfies at least one of the following locations or conditions:

(a) the first vessel position (P1) lies in a venous vessel;

(b) the first vessel position (P1) lies in an arm vein;

(c) the first vessel position (P1) lies on the back of the hand;

(d) the first vessel position (P1) lies at a central venous catheter;

(e) the first vessel position (P1) lies between the back of the hand and the V. axillari;

(f) the first vessel position (P1) lies between a foot and the V. saphena magna; and

(g) the first vessel position (P1) lies in a central venous vessel.

16. The method according to claim 8 wherein the second vessel position (P2) satisfies at least one of the following locations or conditions:

(a) the second vessel position (P2) lies in an arterial vessel;

(b) the second vessel position (P2) lies in a leg artery;

(c) the second vessel position (P2) lies downstream of the third vessel position (P3);

(d) the second vessel position (P2) lies downstream of the bifurcation of the aorta;

(e) the second vessel position (P2) lies in a peripheral artery in a knee region;

(f) the second vessel position (P2) lies in an arm region; and

(g) the second vessel position (P2) lies in a neck region.

17. The method according to claim 8 wherein the third vessel position (P3) satisfies at least one of the following locations or conditions:

(a) the third vessel position (P3) is the second vessel position (P2);

(b) the third vessel position (P3) lies in the Aorta thorakalis;

(c) the third vessel position (P3) lies in the Aorta abdominalis;

(d) the third vessel position (P3) lies between the Aorta thorakalis and (P2);

(e) the third vessel position (P3) lies upstream of the bifurcation of the aorta; and

(f) the third vessel position (P3) lies between the bifurcation and second vessel position (P2).

18. The method according to claim 14 wherein the fourth vessel position (P4) satisfies at least one of the following locations or conditions:

(a) the fourth vessel position (P4) lies upstream of the third vessel position (P3);

(b) the fourth vessel position (P4) lies downstream between the third vessel position (P3) and the second vessel position (P2); and

(c) the fourth vessel position (P4) lies downstream of the second vessel position (P2).

19. The method according to claim 8 wherein a width of the contrast agent bolus profile (B(t)) lies in the range of 3 to 15 seconds preferably but not outside of the range of 1 to 20 seconds.

20. The method according to claim 8 wherein the correlation between the broadening ($\Delta W = W2 - W1$) and the flow parameter (P_G) is gathered from a stored lookup table.

21. The method according to claim 20 wherein the stored lookup table is predetermined from reference measurements and contains at least one of the following parameters as the at least one patient parameter (P_P): sex, weight, height, age, heart rate, body mass index, type of stature, and distance between the vessel positions.

22. The method according to claim 8 wherein the correlation between the broadening ($\Delta W = W2 - W1$) and the flow parameter (P_G) is calculated by a function ($f(P_G, P_P)$) predetermined from reference measurements.

23. The method according to claim 22 wherein the function ($f(P_G, P_P)$) also contains at least one of the following parameters as the at least one patient parameter (P_P): sex, weight, height, age, heart rate, body mass index, type of stature, and distance between the vessel positions.

24. A magnetic resonance system comprising a contrast agent injector controlled by a computer, the computer being equipped with a memory for storing a program therein, the program comprising a method of predetermining a time profile of contrast agent concentration at a position in a blood vessel of a patient in the context of contrast agent-enhanced magnetic resonance imaging of a region of interest only during an initial flooding-in phase of the contrast agent into the blood vessel situated in the region of interest, the method, when executed by the computer, performing the following:

establishing an expected broadening of a contrast agent bolus profile B(t) according to the equation $\Delta W = W2 - W1$ wherein W1 is a first width of the contrast agent bolus profile B(t) at a predetermined first vessel position of the patient and W2 is a second width of a contrast agent concentration profile K(t) at a predetermined second vessel position situated in the region of interest of the patient;

such that the expected broadening is established by determining at least one flow parameter which is dependent on at least one blood flow property of the patient at a third vessel position thereof and which correlates with the expected broadening of the contrast agent bolus profile B(t).