Claims

1. Device (1) for mixing fluids and for producing a fluid mixture, comprising
   - a mixing chamber (20) having a first inlet opening (201) via which a first fluid (7) can be introduced into the mixing chamber (20), a second inlet opening (2011) via which a second fluid (8) can be introduced into the mixing chamber (20), and an outlet opening (202) via which the fluid mixture (9) comprising the first fluid (7) and the second fluid (8) can be discharged,
   - a first supply device (40), which is fluidically connected to the mixing chamber (20) via the first inlet opening (201) and is configured to carry the first fluid (7) along a first fluid flow direction (F_1) into the mixing chamber (20), and
   - a second supply device (50), which is fluidically connected to the mixing chamber (20) via the second inlet opening (2011) and is configured to carry the second fluid (8) along a second fluid flow direction (F_2) into the mixing chamber (20),

   wherein the first supply device (40) comprises a fluidic component (10), comprising
   - an outlet opening (102), which is fluidically connected to the first inlet opening (201) of the mixing chamber (20),
   - at least one means (104a, 104b) for specifically changing the direction of the first fluid (7) that flows through the fluidic component (10), in order to cause an oscillation in space in an oscillation plane of said fluid (7) at the outlet opening (102), and
   - a flow chamber (100) through which the first fluid (7) can flow and which comprises a main flow channel (103), which interconnects an inlet opening (101) of the fluidic component (10) and the outlet opening (102) thereof, and at least one auxiliary flow channel (104a, 104b) as the means for specifically changing the direction of the first fluid (7),

   wherein the mixing chamber (20) has a longitudinal axis (L) which extends along the first fluid flow direction (F_1), wherein the second inlet opening (2011)

of the mixing chamber (20) is offset, relative to the first inlet opening (201) of the mixing chamber (20), along the longitudinal axis (L) of the mixing chamber (20) by a length (l_{2011}), wherein the length (l_{2011}) is not more than five times the width (b_{201}) of the first inlet opening (201), wherein the width (b_{201}) is defined as the extension parallel to the oscillation plane of the first fluid (7) and transversely to the longitudinal axis (L) of the mixing chamber (20).

2. Device (1) according to claim 1, **characterized in that** the first supply device (40) and the first inlet opening (201) of the mixing chamber (20) on the one hand, and the second supply device (50) and the second inlet opening (2011) of the mixing chamber (20) on the other hand, are arranged relative to one another in such a way that the first fluid flow direction (F_1) and the second fluid flow direction (F_2) enclose an angle of 0° to 90°, preferably of 35° to 55°, particularly preferably of 45°.

3. Device (1) according to claim 1, **characterized in that** the second supply device (50) and the second inlet opening (2011) of the mixing chamber (20) are arranged in such a way that the second fluid flow direction (F_2) and the oscillation plane of the first fluid (7) enclose an angle (η), in a plane transverse to the first fluid flow direction (F_1), of 30° to 150°, preferably 90°.

4. Device (1) according to claim 1, **characterized in that** the cross-sectional area of the mixing chamber (20), which is defined transversely to the longitudinal axis (L), changes along the longitudinal axis (L).

5. Device (1) according to claim 4, **characterized in that** the cross-sectional area increases, proceeding from the first inlet opening (201) of the mixing chamber (20) in an upstream end portion of the mixing chamber (20) forming an inlet channel (206), with increasing distance from the first inlet opening (201), and/or in that the cross-sectional area reduces in a downstream end portion of the mixing chamber (20) forming an outlet channel (207), with

increasing distance from the first inlet opening (201).

6. Device (1) according to claim 5, **characterized in that** the extension of the mixing chamber (20) in the oscillation plane and transversely to the longitudinal axis (L), proceeding from the first inlet opening (201) of the mixing chamber (20), in the inlet channel (206), increases with increasing distance from the first inlet opening (201), or in that the extension of the mixing chamber (20) in the oscillation plane and transversely to the longitudinal axis (L) in the outlet channel (207) decreases with increasing distance from the first inlet opening (201).

7. Device (1) according to claim 5, **characterized in that** the second inlet opening (2011) of the mixing chamber (20) is provided inside the inlet channel (206).

8. Device (1) according to claim 7, **characterized in that** the distance between the first and the second inlet opening (201, 2011) along the longitudinal axis (L) corresponds to at least half the width (b_{201}) of the first inlet opening (201) of the mixing chamber (20), wherein the width (b_{201}) is defined in parallel with the oscillation plane and transversely to the longitudinal axis (L).

9. Device (1) according to claim 1, **characterized in that** the mixing chamber (20) is of a volume that is greater than the volume of the fluidic component (10) or of the flow chamber (100) of the fluidic component (10).

10. Device (1) according to claim 1, **characterized in that** the second supply device (50) is provided and configured to carry the second fluid (8) as a (quasi) stationary flow into the mixing chamber (20), or in that the second supply device (50) comprises a fluidic component (10), comprising
    - an outlet opening (102), which is fluidically connected to the second inlet opening (2011) of the mixing chamber (20), and

- at least one means (104a, 104b) for specifically changing the direction of the second fluid (8) that flows through the fluidic component (10), in order to cause an oscillation in space of said fluid (8) at the outlet opening (102).

11. Device (1) according to claim 1, **characterized in that** a second mixing chamber (20') adjoins the outlet opening (202) of the mixing chamber (20), in the downstream direction, wherein the second mixing chamber (20') comprises a first inlet opening (201'), a second inlet opening (2011'), and an outlet opening (202'), wherein the first inlet opening (201') of the second mixing chamber (20') corresponds to the outlet opening (202) of the upstream mixing chamber (20).

12. Device (1) according to claim 1, **characterized in that** an interaction channel (30) adjoins the outlet opening (202, 202') of the mixing chamber (20) or of the second mixing chamber (20'), respectively, in the downstream direction, which interaction channel has at least one bend.

13. Method for mixing fluids and for producing a fluid mixture, comprising the following steps:
- providing a device (1) according to claim 1, a first fluid (7), and a second fluid (8),
- introducing the first fluid (7), at a first volume flow, into the mixing chamber (20) via the first supply device (40), and simultaneously introducing the second fluid (8), at a second volume flow, into the mixing chamber (20) via the second supply device (50),
- discharging the fluid mixture (9), comprising the first fluid (7) and the second fluid (8), out of the mixing chamber (20) via the outlet opening (202) thereof.

14. Method according to claim 13, **characterized in that** the first volume flow is greater than the second volume flow, or in that the first volume flow and the

second volume flow are of the same size.

15. Method according to claim 13, **characterized in that** the first fluid (7) and the second fluid (8) is in each case a liquid or a suspension comprising a liquid and particles distributed therein.

16. Method according to claim 13, **characterized in that** the introduction of the first fluid into the mixing chamber, and the introduction of the second fluid into the mixing chamber, take place continuously in each case.

17. Method according to claim 13, **characterized in that** the first fluid (7) and the second fluid (8) differ with respect to the chemical composition and/or concentration of individual components.

18. Method according to claim 13, **characterized in that** the first fluid (7) comprises RNA, in particular mRNA, and in that the second fluid (8) comprises a lipid mixture.

19. Device (1) according to claim 1, **characterized in that** the first supply device (40) is configured to bring about the specific change in direction of the first fluid (7) in such a way that the first fluid (7) moves in a temporally variable manner within the mixing chamber (20), wherein the first fluid (7) comprises a movement component along the first fluid flow direction (F_1) and a movement component transversely to the first fluid flow direction (F_1), wherein the first fluid (7) moves, in particular periodically, in a temporally variable manner, within the mixing chamber (20).